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FM 6-121

DEPARTMENT OF THE ARMY FIELD MANUAL

**FIELD ARTILLERY
TARGET
ACQUISITION**

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HEADQUARTERS, DEPARTMENT OF THE ARMY
NOVEMBER 1967

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FIELD MANUAL

No. 6-121

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 1 November 1967

FIELD ARTILLERY TARGET ACQUISITION

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*This manual supersedes FM 6-121, 5 October 1962.

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Purpose and Scope

a. This manual is a guide for commanders, field artillery S2's, and staffs of all combat arms. It pertains to field artillery target acquisition to include planning, employment, and coordination of all target acquisition means. Where the term artillery is used in this manual, it refers to field artillery.

b. The material presented herein is applicable to general war to include considerations for employment of and protection from chemical, biological, and radiological agents; limited war; and cold war to include stability operations in an internal defense and internal development assistance operations environment.

1-2. Changes or Comments

Users of this manual are encouraged to submit recommended changes or comments to improve the manual. Comments should be keyed to the specific page, paragraph, and line of the text in which the change is recommended. Reasons should be provided for each comment to insure understanding and complete evaluation. Comments should be forwarded direct to Commanding Officer, U.S. Army Combat Developments Command Artillery Agency, ATTN: CAGAT-DC, Fort Sill, Oklahoma 73503. Originators of proposed changes which would constitute a significant modification of approved Army doctrine may send an information copy, through command channels to Commanding General, U. S. Army Combat Developments Command, Fort Belvoir, Virginia 22060, to facilitate review and followup.

1-3. Terms

a. *Target Acquisition.* The detection, identification, and location of a target in sufficient

detail to permit the effective employment of weapons.

(1) *Direct target acquisition.* Target acquisition obtained by one intelligence collection means. For example, countermortar radar, forward observer, photograph.

(2) *Indirect target acquisition.* Target acquisition which is developed from evaluation of intelligence information supplied by two or more means. For example, a comparison of interrogation reports (PW) with reports of vehicle traffic (aerial radar) and reports of radio activity (COMINT).

b. *Combat Surveillance.* A continuous, all weather, day and night, systematic watch over the battle area to provide timely information for tactical ground combat operations.

c. *Observation.* The examination or study made of such things as terrain, artillery fire, or atmospheric conditions to obtain information of military value.

(1) *Direct observation.* Observation by direct vision, or vision aided by electronic or optical instruments.

(2) *Indirect observation.* Observation through study of imagery.

d. *Counterbattery.* The term counterbattery includes fires on mortars, cannon, rockets, and missiles. Counterbattery intelligence has as its objective the gathering of complete information pertaining to hostile firing means.

(1) *Activities.* All activities engaged in for the purpose of locating, neutralizing, or destroying enemy artillery.

(2) *Fire.* Fire delivered against active enemy weapons and/or fire control stations.

Section II. TARGET ACQUISITION AGENCIES

1-4. General

a. Target acquisition agencies are part of the intelligence gathering agencies of the force as a whole, and as such, are major components of the combat intelligence system at all echelons.

b. Army combat elements contribute information from frontline observers, patrol reports, and other visual and electronic means. Other sources of information which may be exploited in target locations are—

- (1) Shelling reports.
- (2) Mortar reports.
- (3) Reconnaissance patrols.
- (4) Long-range patrols.
- (5) Combat patrols.
- (6) Prisoners of war.
- (7) Line crossers.
- (8) Agents.
- (9) ASA.
- (10) Special forces.
- (11) Stay-behind forces.
- (12) Army aviation.
- (13) Civil affairs units.
- (14) Friendly populace.
- (15) Psychological teams.

1-5. Artillery Target Acquisition

a. Although artillery intelligence agencies collect and report all information of military significance, their primary concern is gathering and processing target information of importance to artillery operations. The target acquisition effort is continuous and aggressive and extends through the zone of action in order to provide for the full exploitation of artillery's firepower capabilities. Artillery information is disseminated in the most expeditious manner to insure delivery of effective and timely fire; therefore, artillery target acquisition elements work closely with all fire support and coordinating agencies.

b. Target data obtained from organic artillery target acquisition agencies are plotted on the same military grid as that used to plot the artillery weapons positions. This reduces reaction time and facilitates rapid neutralization or destruction fires. The majority of hostile targets may be fleeting in nature; therefore,

immediate responsiveness from friendly firing units is essential and there should be no delay in the transmission or intelligence processing of target information.

c. Target information is collected by continuous planning and systematic direction of the collection efforts. Effective utilization of the sources and agencies available for target information requires that the artillery S2 know the capabilities and limitations of these agencies.

1-6. Organic Artillery Target Acquisition Agencies

a. *General.* Target acquisition means are organic to the field artillery target acquisition battalion (FATAB), headquarters and headquarters battery of division artillery, headquarters and headquarters battery of the direct support howitzer battalions, and to a lesser extent to other artillery battalions.

b. *Field Artillery Target Acquisition Battalion.* The field artillery target acquisition battalion (TOE 6-575), assigned to corps artillery, consists of a headquarters and headquarters battery (TOE 6-576) and three field artillery target acquisition batteries (TOE 6-577). Unlike other artillery units, the FATAB is an organization whose primary mission is to furnish target data to the field artillery.

(1) *Headquarters and headquarters battery* (fig. 1-1). The headquarters battery consists of—

- (a) Battery headquarters.
- (b) Operations platoon.
- (c) Survey platoon.
- (d) Communications platoon.
- (e) Battalion personnel section.
- (f) Battalion support and maintenance section.
- (g) Medical section.

(2) *Target acquisition battery* (fig. 1-2). The target acquisition battery consists of—

- (a) Battery headquarters.
- (b) Processing section.
- (c) Communications platoon.
- (d) Survey platoon.
- (e) Sound ranging platoon.

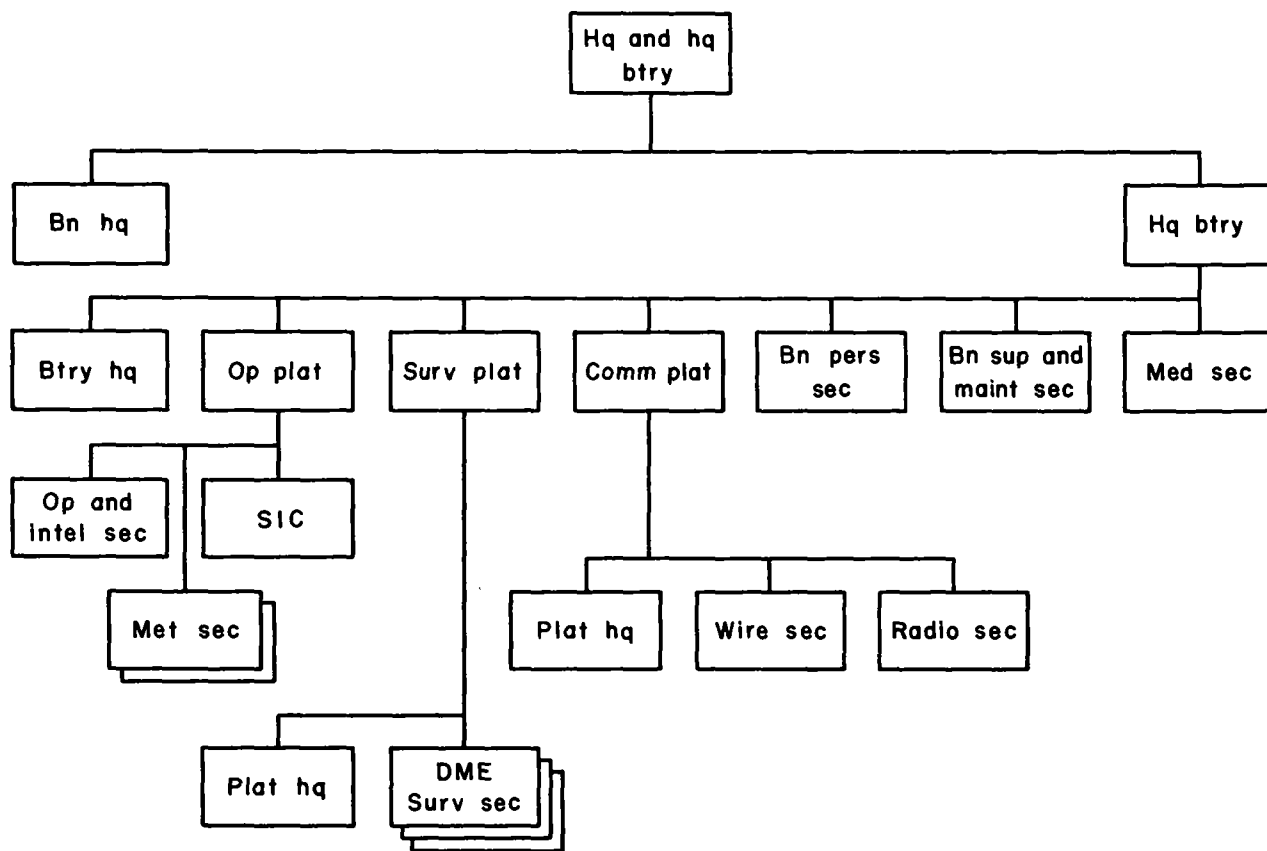


Figure 1-1. Headquarters and headquarters battery (TOE 6-576), field artillery target acquisition battalion.

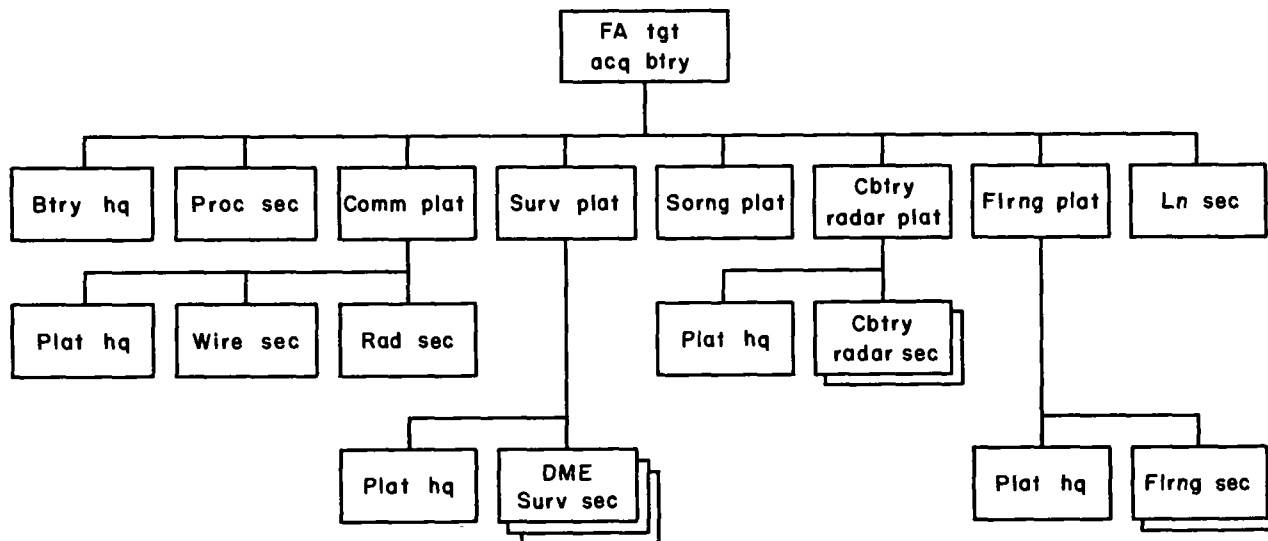


Figure 1-2. Field artillery target acquisition battery (TOE 6-577).

- (f) Counterbattery radar platoon.
- (g) Flash ranging platoon.
- (h) Liaison section.

c. Division Artillery. The target acquisition platoon (fig. 1-3) of the division artillery headquarters and headquarters battery in-

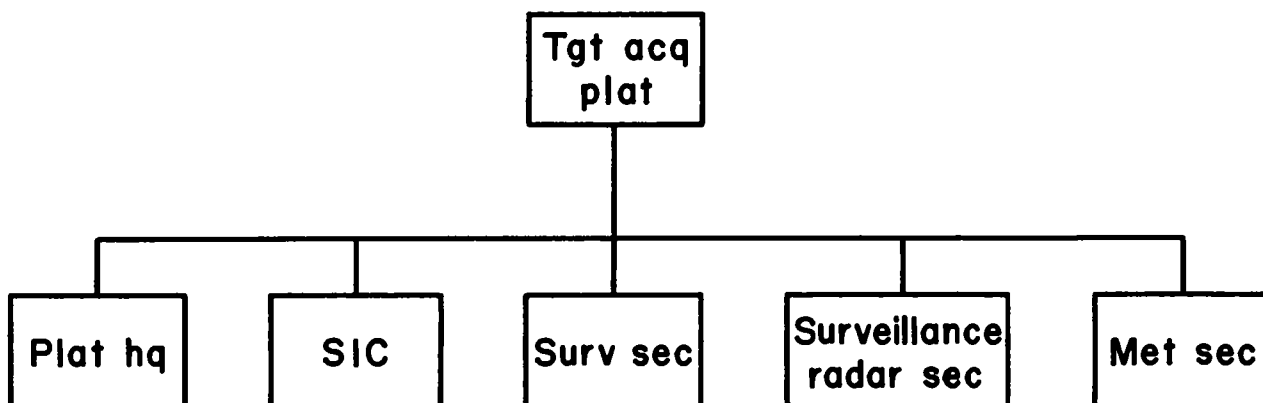


Figure 1-3. Target acquisition platoon, headquarters and headquarters battery, division, artillery, armored, infantry (mechanized), or airborne division.

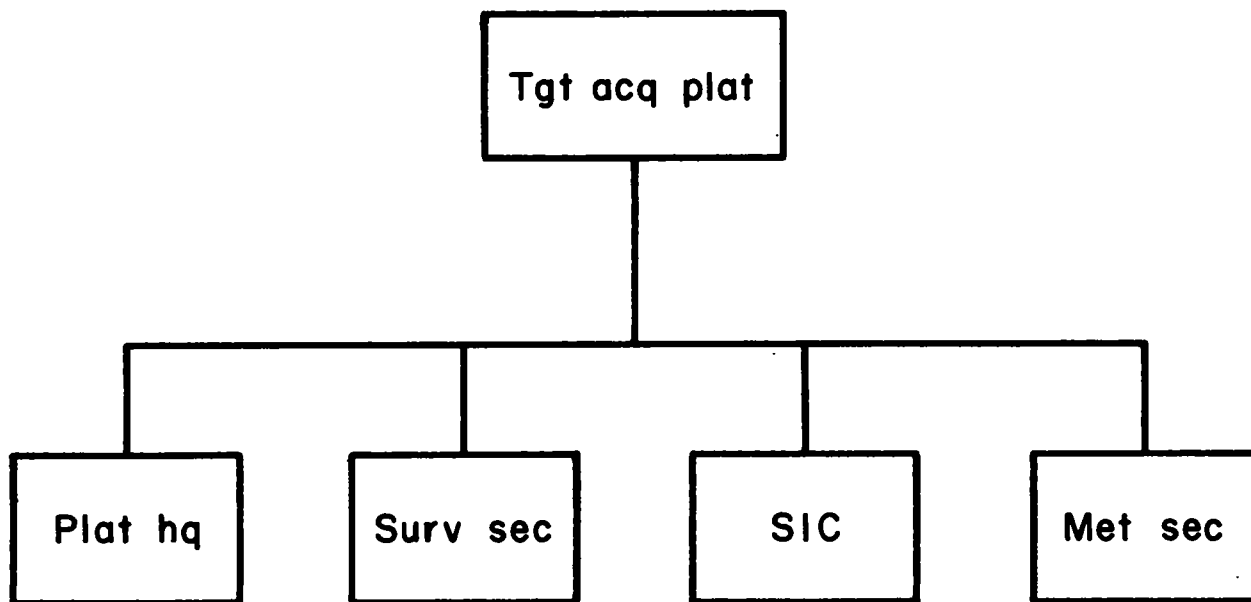


Figure 1-4. Target acquisition platoon, headquarters and headquarters battery, division artillery, airmobile division.

cludes those elements actively engaged in locating targets together with the agencies required to furnish data to the weapons delivery systems. They are—

- (1) Platoon headquarters.
- (2) Survey information center.
- (3) Survey section.
- (4) Surveillance radar section.
- (5) Meteorological section.

d. Target acquisition platoon, airmobile division artillery (fig. 1-4). The target acquisition platoon in the headquarters and

headquarters battery of the airmobile division artillery consists of—

- (1) Platoon headquarters.
- (2) Survey information center.
- (3) Survey section.
- (4) Meteorological section.

e. 105-mm or 155-mm Howitzer Battalion (hereafter referred to as the direct support (DS) battalion). The target acquisition platoon (fig. 1-5) consists of—

- (1) Platoon headquarters.
- (2) Survey section.

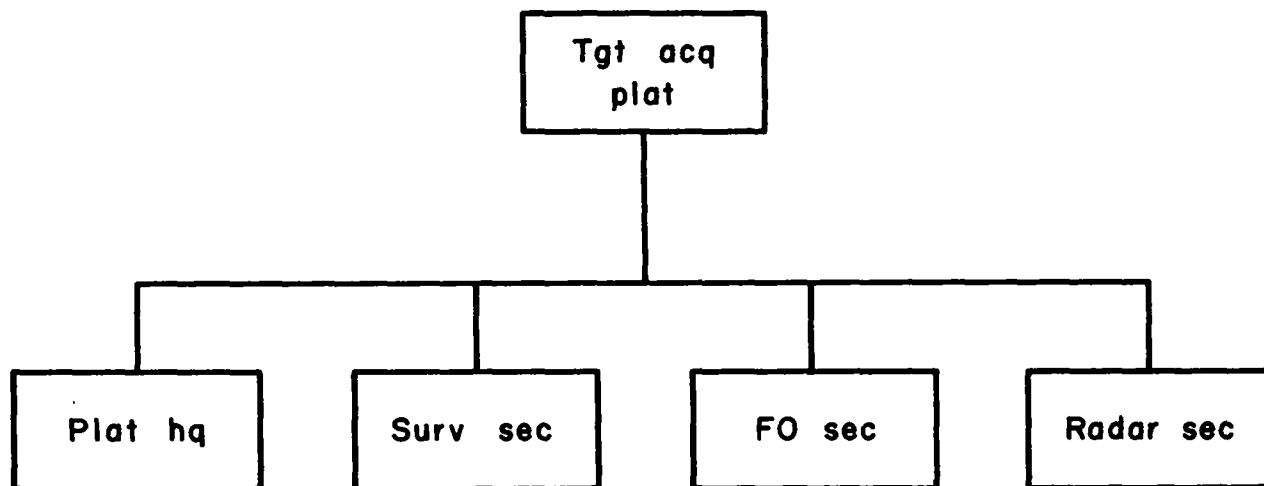


Figure 1-5. Target acquisition platoon, headquarters and headquarters battery, direct support battalion, armored, infantry (mechanized), or airborne division.

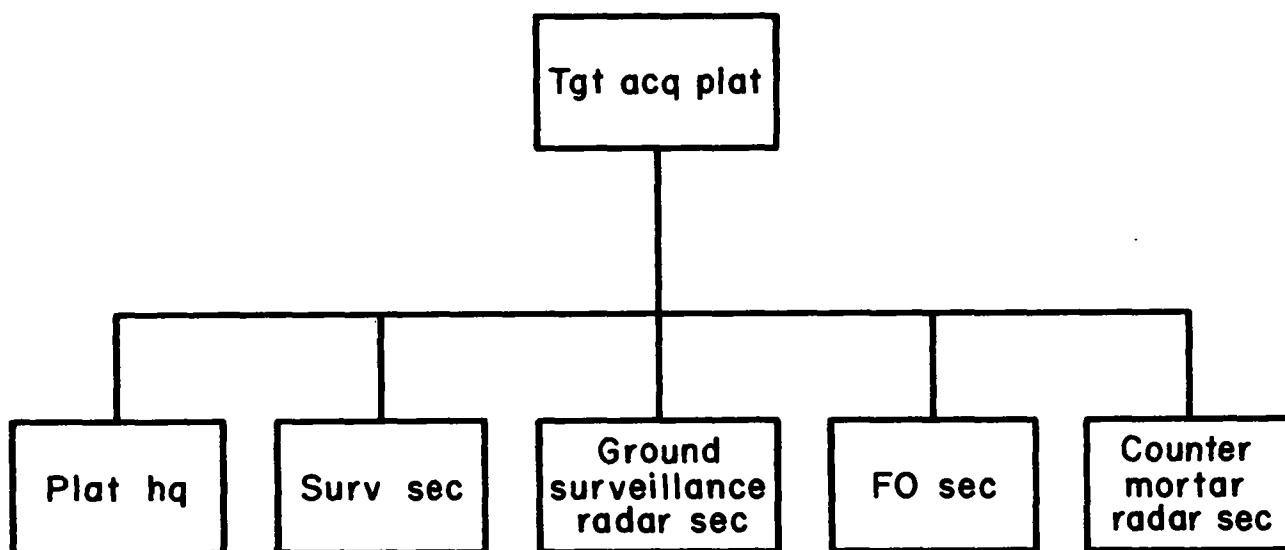


Figure 1-6. Target acquisition platoon, headquarters and headquarters battery, direct support battalion, separate brigade.

- (3) Countermortar radar section.
- (4) Forward observer (FO) section.

f. Direct Support Battalion, Separate Brigade. The target acquisition platoon in the DS artillery battalion of separate brigades is employed generally the same as it is in the divisions. This platoon (fig. 1-6) consists of—

- (1) Platoon headquarters.
- (2) Survey section.

- (3) Ground surveillance radar section.
- (4) Countermortar radar section.
- (5) Forward observer section.

g. 105-mm and 155-mm Batteries, DS Battalions. DS batteries of the infantry and airborne divisions each contain four FO sections, and the DS batteries of the mechanized and armored divisions each contain three FO sections. The forward observers are an important part of the target acquisition effort.

Section III. TACTICAL EMPLOYMENT OF TARGET ACQUISITION AGENCIES

1-7. General

a. The tactical situation and the width of the front will govern deployment of artillery target acquisition agencies. Devices and systems employed by these agencies normally provide either direct or indirect observation at ranges up to 20 km. Both corps and division artillery target acquisition elements normally are employed within 2 to 4 km of the FEBA. In selecting positions for radar, sound, and flash ranging equipment of the FATAB, the mission of the unit, the situation, the characteristics of the equipment, and the characteristics of enemy materiel are considered. Positions are selected where the terrain best facilitates operation of the equipment. The CP's of the target acquisition batteries normally will be located in close proximity to a division artillery or separate field artillery group FDC to facilitate operations and take advantage of local security measures.

b. The target acquisition unit commander advises higher headquarters on the technical capabilities and limitations which will affect the employment of his unit under the existing tactical conditions.

c. Target acquisition units operate in the forward combat area and, therefore, will be subject to hostile air attacks. The low altitude air threat may be partially countered by the aggressive and discriminate use of a large volume of fire delivered by nonair defense weapons (small arms and certain crew-served weapons). Rules for engagement, techniques, and items to be included in a unit SOP are included in FM 6-140 and FM 6-120.

1-8. Tactical Employment of FATAB

a. Tactical missions that may be assigned to the FATAB are as follows:

(1) *General support of corps artillery.*

When assigned this mission, the FATAB commander exercises maximum centralized control of his subordinate units. The FATAB operations section is normally collocated with the corps artillery operations section to permit rapid and timely reaction to target and general intelligence collected by

acquisition agencies within the battalion. The FATAB is deployed to operate in the zone of action of the corps and will direct deployment of its batteries within this zone as required. Battery CP's normally will be located in close proximity to the division artillery FDC or field artillery group FDC to facilitate operations and for local security. The battalion will displace on order of the corps artillery commander; the batteries will displace on order of the battalion commander.

- (2) *Direct support of division artillery or field artillery group.* While the FATAB is normally assigned a mission of general support, one or more of the target acquisition batteries may be assigned the mission of direct support of a division artillery or field artillery group. The battalion exercises a lesser degree of control of its batteries when they are assigned a direct support mission. Normally, the battery processing section is collocated with the supported unit operations center to facilitate rapid and timely reporting of all target and general intelligence information. This information is also transmitted to corps artillery by the supported unit and by the target acquisition (TA) processing section of the FATAB operations center. The battery will operate in the zone of action of the supported unit. This does not mean that the battery is restricted to the boundaries of the supported unit for deployment of its platoons, but must be able to locate targets within the zone of action of the supported unit. The battery will displace on order of the FATAB unit commander or when ordered by the force artillery headquarters. The target acquisition batteries normally will be employed in direct support of division artillery under the following conditions:

- (a) When there is an exceptionally wide corps front.
- (b) In the offensive phase of combat.
- (c) During rapidly changing situations requiring timely displacement of elements to insure continuous target acquisition coverage.
- (d) When communications (terrain or distance) do not permit the FA-TAB commander to exercise full control of his batteries.
- (e) When the attachment of additional artillery firing units generates a requirement for target acquisition support which exceeds the capability of the division artillery.

b. A target acquisition battery may be attached to division artillery on a special mission, or to an artillery element with a task force. In this role, the processing section of the battery is collocated with the supported artillery operations center to permit rapid and timely reaction to collected intelligence information. The battery will operate in the zone of action of the unit to which attached, and will displace as directed by that unit.

c. In a stability operations environment, decentralized control of artillery, defense of base areas and enclaves, and airmobile operations may dictate attachment or direct support.

1-9. Tactical Employment of Division Artillery Target Acquisition Agencies

All target acquisition systems within the division artillery structure normally are employed by the individual unit commander in support of his mission. Overall guidance and coordination of the total division artillery collection effort is the staff responsibility of the division artillery S2.

a. *Target Acquisition Platoon, Headquarters and Headquarters Battery, Division Artillery.* The ground surveillance radar is employed under the supervision of the division artillery S2 in coordination with the division artillery S3 and the force commander concerned. Since the radar supports the entire division artillery, the area in which it is employed is dependent upon the tactical situation. This area is designated by the division artillery S2.

b. *Target Acquisition Platoon, Headquarters and Headquarters Battery, DS Battalion.* The countermortar radar section normally is employed under the supervision of the battalion S2. It is normally employed to cover the zone of action of the supported unit.

1-10. Displacements

Timely and rapid displacements of target acquisition units are necessary to provide continuous support. Target acquisition support is maintained during displacements by displacing platoons by echelon. Displacements are accomplished as rapidly as possible so that operation can be resumed with a minimum of delay and to minimize the possibility of the displacing unit's detection and attack by the enemy. Command posts are normally displaced by echelon to insure continuity of control. Initial communication is installed and operations are begun at the new command post prior to displacement of the old command post. All target acquisition agencies and fire support elements should be placed on a common grid as soon as possible to facilitate the timely and accurate delivery of fire on the located targets. When possible, survey is completed before displacement is begun. Survey requirements for target acquisition systems are discussed in detail in paragraphs 1-19 through 1-22.

1-11. Relief in Combat

a. *General.* Relief in combat is of two general types: Passage of lines and relief in place. Either type of relief may be accomplished by target acquisition agencies. Relief during passage of lines is accomplished by the relieving unit installing and occupying the forward positions of the unit being relieved. This type relief entails more detailed planning and cooperation between incoming and outgoing target acquisition units.

b. *Warning Orders.* When a relief in place or a passage of lines is to be made, warning orders are issued by the commanders of the next higher headquarters, the relieving unit, and the relieved unit. Warning orders should include the hour the movement for the relief is to begin and end, the zone of operation of the relieving unit, and any restrictions imposed upon reconnaissance parties.

1-12. Psychological Operations (PSYOP)

Target acquisition units participate in psychological operations to gain support and confidence of the local population as a part of the overall stability effort. Personnel from PSYOP units may assist target acquisition agencies by reporting targets acquired during

aerial leaflet dissemination and loudspeaker broadcast activities. When directed, target acquisition units may participate in planned psychological operations especially in the area of facilitating the intelligence collection by gaining support of the populace and providing instructions on how to report information. For further guidance on PSYOP, see FM 33-1.

Section IV. DUTIES OF KEY PERSONNEL

1-13. General

A thorough development of artillery intelligence is necessary for the proper employment of artillery units, the timely and effective delivery of fire, and coordination of movement and fire support with the supported unit and other supporting arms. The efficiency with which the artillery fulfills its mission depends largely on adequate and timely target intelligence.

1-14. Staff Responsibility for Intelligence (S2)

In addition to those duties found in FM 6-140, the S2 will—

a. Prepare a consolidated capabilities chart and indicate to the S3 any coordination necessary to insure maximum coverage of the area of operation.

b. Recommend the general position area for the surveillance radar.

c. When engaged in stability operations, maintain close liaison with the intelligence sections of host country (HC) artillery units that may be operating in the area and with the area coordination center.

1-15. S3 of FATAB

The S3 of the target acquisition battalion is operations officer of a battalion whose main operation is intelligence. Consequently, many duties normally performed by the S2 will become a part of the major efforts of the FATAB S3. The FATAB S3 primary function is the locating of targets. He, rather than the S2, is the principal staff officer for coordination of the target acquisition effort. In addition to those duties found in FM 6-140, the FATAB S3 will—

a. Assign general areas of operation to the batteries based upon requests for information initiated by the corps artillery S2.

b. Designate priorities for specific suspect areas to the batteries for primary zones of observation.

c. Consolidate the battery capabilities charts into a battalion capabilities chart and forward it to corps artillery and the supported units.

1-16. Counterbattery Intelligence Officer (CBIO)

The counterbattery intelligence officer (CBIO) is the corps (division) artillery intelligence staff officer responsible for securing accurate information of the enemy indirect fire weapons and for recommending appropriate counterbattery fire. The CBIO assists the corps (division) artillery S2 and S3 by furnishing counterbattery information required to develop a counterbattery program in the conduct of deliberate operations, to develop and estimate the hostile artillery situation for the force commander and higher headquarters, and to facilitate intelligence discrimination in the selection of counterbattery targets of opportunity. In addition, he—

a. Collects and consolidates counterbattery information from all intelligence sources.

b. Evaluates, interprets, records, and disseminates counterbattery information.

c. Assists in damage assessment.

1-17. Reconnaissance and Survey Officer

In the performance of his duties, the survey officer is closely associated with target acquisition agencies in that the devices employed by these agencies require survey control. Predicted fire techniques require that a common grid be established between delivery systems

and the targets attacked by them. The transfer of accurate target data is impossible without control for the target acquisition devices. His specific duties are to—

- a. Prepare survey plans.
- b. Obtain survey control and extend control to lower echelon artillery units.
- c. Supervise field work of the survey platoon.
- d. Execute survey plans.
- e. Conduct reconnaissance for routes, position areas, and observation posts as directed by the commander.
- f. Supervise survey training within the command.
- g. Plan continuously for future reconnaissance and extension of survey.
- h. Collaborate closely with the S2 and S3 in securing needed information concerning target location, observation, routes, and future position areas.

i. Exchange survey data and information with the survey officers of higher, lower, and adjacent units. This may include establishing a survey information center and coordinating with the corps engineer topographic company which maintains map supplies and provides survey control to the division.

j. Determine the accuracy of available maps.

k. During stability operations, exchange survey data and information with appropriate survey elements of the HC units.

1-18. Target Acquisition Platoon Leader

The duties of the target acquisition platoon leader are to—

- a. Advise the commander and staff in matters relating to planning for, and employment of, elements of the target acquisition platoon.
- b. Assist the S2 in CBIO duties as directed.
- c. Direct and supervise the training of platoon personnel and employment of platoon elements.

Section V. SURVEY APPLICATIONS TO TARGET ACQUISITION

1-19. Purpose of Artillery Survey

The purpose of artillery survey is to provide a common grid for firing units and target locating installations. Target locations are determined by the extension of survey control from the target locating devices.

1-20. Target Location by Extension of Survey Control

a. Connection survey is that survey performed for the purpose of placing the target area survey and the position area survey on a common grid.

b. Target area survey is that survey performed for the purpose of establishing the target area base and locating critical points in the target area. For detailed discussion, see FM 6-2.

1-21. Ground Based Target Acquisition Systems

a. Visual.

- (1) *Forward observers.* Often, the rapid and frequent displacement of forward observers with infantry com-

panies makes it extremely difficult to provide survey for their positions. Position requirements are usually met by map inspection or by estimation. Direction may be obtained by use of a compass or by map inspection.

- (2) *Artillery battalion observation posts.* Survey control for artillery battalion observation posts is provided by the surveyors organic to the unit. Location of registration and restitution points are determined by the survey intersection method from two or more OP's. Fifth-order survey procedures are used to establish survey control for OP's.
- (3) *Flash ranging observation posts.* Survey control for flash ranging observation posts is provided by the surveyors organic to FATAB based either on existing survey control in the area or on survey control points established by the corps engineer topo company. Fourth-order proce-

dures are used to establish survey control with orientation accurate to ± 1 mil.

b. Radar.

- (1) *Ground surveillance radar.* Position and direction data for ground surveillance radar should be furnished by survey personnel. For hasty operations when large scale maps are available, map inspection data can be used. Better results can be achieved when fifth-order survey control for positioning and orientation of radar is provided. This radar has a unique survey requirement in that it requires distance to reference points in addition to direction.
- (2) *Counterbattery and countermortar radar.* Fifth-order survey control is provided for the positioning and orienting of the countermortar radar. The counterbattery radar AN/MPQ-10A is located using fourth-order

survey procedures.

c. Sound. Fourth-order survey control is required for each sound microphone of the target acquisition battery. The target acquisition battery surveyors normally perform the sound base survey in conjunction with other survey requirements.

1-22. Other Target Acquisition Systems

a. Within the corps and division areas, non-artillery agencies may require survey for their equipment to facilitate target acquisition. When practicable and convenient, artillery units may provide survey data to nonartillery units; however, when the survey data required exceeds the capabilities of the artillery units, this data is supplied by engineer topographic units.

b. Long range patrols, agents, and U.S. Army special forces have a target acquisition capability. Extended target area survey facilitates their operations and increases the accuracy of the target information which they report.

Section VI. METEOROLOGY

1-23. General

The wide dispersion of army forces on the modern battlefield and the sophistication of current weapon systems has increased the Army's requirements for information on atmospheric conditions. This information can be divided into two general areas: information concerning weather and climate, and artillery meteorological data. Information concerning weather and climate encompasses weather forecasts, weather summaries, and climatological reports required for military tactical and strategic operations. Artillery meteorological data include ballistic meteorological messages, sound ranging messages, wind information for fallout prediction, atmospheric data for the air weather service detachments with the field army, pressure data for missiles, computer meteorological messages, and low-level wind data for rockets.

1-24. Mission

The mission of artillery meteorological sections is to—

- a.* Provide ballistic and computer meteoro-

logical messages to artillery firing units for use in correcting firing data for existing non-standard weather conditions.

b. Provide meteorological messages to the sound platoons of the target acquisition battalion for determining corrections in sound locating data resulting from existing non-standard weather conditions.

c. Provide wind data for fallout prediction.

d. Provide weather information as requested by air weather service units.

1-25. Organization

a. Two meteorological (met) sections are organic to the target acquisition battalion and are an element of the headquarters and headquarters battery. Each section is composed of one warrant officer and 17 enlisted personnel. For continuous operation, the section usually is divided into two 8-man teams. The chief of section assists the met officer in continuing operations and the radio operator is primarily responsible for message transmission.

b. Within each field army, there is a network of artillery meteorology sections which exist

for the purpose of conducting atmospheric soundings and disseminating current meteorological data. Each division artillery has one meteorological section; and the corps FATAB has two. Thus, a 12-division, three-corps field army has at least 18 met sections continuously processing atmospheric data. Although they are an additional source of weather data, these sections are not trained or equipped to perform weather forecasting.

1-26. Staff Supervision

a. The weather services provided to the field army by the air weather service are accomplished under the staff supervision of the intelligence officer at each echelon.

b. Ballistic meteorological data produced by artillery meteorological sections are not classified as intelligence weather data. Artillery meteorological sections are part of the artillery weapons system; and their operations and activities, to include communications and scheduling required for dissemination of meteorological messages, are accomplished under the staff supervision of the operations officer at each echelon.

c. A meteorological quality control team is located at each corps artillery to examine samples of the data evaluated by the met sections assigned to a corps. This team is supervised by the corps artillery meteorological staff officer who is normally an assistant S3, corps artillery. The general duties of this team and the staff officer are as follows:

(1) *Corps artillery meteorological quality control team.*

- (a) Examine random samples of the data obtained by met sections assigned to the corps and evaluate the data.
- (b) Perform inspections of all met sections in the corps area at the direction of the corps artillery commander and under the supervision of the corps artillery metro staff officer.
- (c) Provide assistance to all met sections in the corps area concerning

problems of maintenance, training, and supply.

(2) *Corps artillery meteorological staff officer.*

- (a) Advises the commander and staff on all aspects of ballistic meteorology, to include the organization, capabilities, procedures, and effectiveness of the artillery met sections of the corps.
- (b) Coordinates the upper air soundings within the corps area to insure the acquisition of valid data from a comprehensive meteorological network.
- (c) Makes plans and recommendations pertaining to requirements for, and employment of, artillery met sections within the corps area.
- (d) Exercises technical supervision over artillery met training and supply throughout the command.
- (e) Supervises the activities of the met quality control team.

1-27. Capabilities and Equipment of Meteorological Sections

a. The met sections of the target acquisition battalion have the capability of sounding the atmosphere up to 30,000 meters, day or night. The limiting factors are severe surface winds and the period of time required for a sounding balloon to ascend. Low altitude soundings can be made every 2 hours. The higher altitude soundings require a reduction in frequency to about every 3 hours. Ballistic messages for light artillery can be produced in 30 minutes. The minimum time required to produce a fall-out message is about 2 hours. In the event of failure of electronic equipment, sections have the capability of measuring upper air winds by pilot balloon observation and predicting upper air density and temperatures using climatological tables. Sections are further capable of reporting a variety of parameters, such as the discomfort index, wind chill factor, and surface winds.

b. For major items of equipment, see FM 6-15.

CHAPTER 2

TARGET ACQUISITION SYSTEMS

Section I. GROUND SYSTEMS

2-1. General

A target acquisition system consists of the equipment necessary to perform timely detection, identification, and three-dimensional location of ground targets in sufficient detail to permit the effective employment of weapons against such targets. In order to provide a standard method of describing ground locations, areas, and boundaries, the NATO Forces have concurred in the provisions of STANAG No. 2029, Method of Describing Ground Locations, Areas and Boundaries which is contained in its entirety in appendix E. Systems available to the artillery are discussed in paragraphs 2-2 through 2-9.

2-2. Visual

a. Forward Observers (FO). Forward observers perform a very important target acquisition function; however, the distances over which they can acquire target information is limited. FO parties are assigned on the basis of one per maneuver company. Although the forward observer's primary mission is to request fire support on targets in the supported company's zone of action, he can be of great assistance to the S2 in collection of general battlefield information within the limits of his field of observation. In a stability operation, where artillery fire may be used to support the defense of fixed military and civilian installations, forward observer parties may include indigenous military and civilian personnel unskilled in forward observer procedures.

b. Observation Posts. Each cannon-type field artillery battalion should establish its own observation posts (OP) to supplement the observation posts of the forward observers with

the frontline units. Because observation is so important, artillery units are usually required to install OP's at points that will provide overlapping coverage of the entire front. Such observation, when integrated with the observation provided by the forward observers with the supported units, and by the maneuver units, reduces the possibility of close-in undetected surprise moves by the enemy. It also supplements information contributing to the employment of more efficient use of firepower against the enemy. As time permits, battalion OP's are located by survey methods (FM 6-2). The base formed by two or more OP's located by survey may be used for location of targets by intersection. For details of such base operations, see the discussion of short base operations in FM 6-122.

c. Flash Ranging.

- (1) *General.* Since optical instruments are used by the flash ranging platoon, line of sight to the target is required. These instruments are passive devices and, if properly concealed, are difficult to locate by the enemy.
- (2) *Organization.* One flash ranging platoon is organic to each target acquisition battery of the field artillery target acquisition battalion. This platoon is completely mobile and can operate 24 hours a day.
- (3) *Missions.* The flash ranging platoon performs five principal missions. They are—
 - (a) Location of hostile artillery.
 - (b) Registration and adjustment of friendly artillery.
 - (c) Collection of battlefield information.

- (d) Comparative calibration.
- (e) Verification of location of friendly nuclear bursts.
- (4) *Tactical employment.* Flash ranging can be accomplished in both mobile and static warfare.
 - (a) In mobile warfare, flash ranging platoons are employed aggressively in order to provide sustained coverage. The initial installation usually employs a short base with expansion to a long base whenever possible. Adjustment on active targets occurs more frequently than the reporting of a corrected target location.
 - (b) In static warfare, the long base is usually employed. The initial installation may or may not be short base, but an expansion to a long base is normally carried out as quickly as the situation permits. Corrected locations of targets are reported to higher echelons.
- (5) *Short base.* The short base, consisting of two OP's, is used when as analysis of the four primary considerations (time available, terrain, communications, and survey) shows that use of a long base is impractical or impossible. When the OP's are located using survey, targets are reported by coordinates. When survey is not available, fire is adjusted on targets. The width of the area of coverage of the short base is approximately 2,000 meters. The short base can be installed in 30 to 90 minutes.
- (6) *Long base.* The flash ranging base contains four OP's located using fourth-order survey procedures. With this type base, coordinates of hostile artillery can be determined at ranges up to the limit of visibility with accuracies from 0 to 50 meters. Accuracies are assigned to each location reported (FM 6-122). These accuracies are utilized in evaluating reported locations. The width of the area of coverage may extend from 6,000 to 10,000 meters.

2-3. Radar

a. General. Three types of radars are used by the field artillery countermortar, counterbattery, and ground surveillance. All are active devices and subject to electronic countermeasures. Radars can be employed in both mobile and static warfare. In mobile warfare, radars are employed aggressively in order to provide sustained coverage. In static warfare, alternate positions should always be prepared to circumvent the enemy in his efforts to neutralize the radar. Countermortar and counterbattery radars have a mobility comparable to that of a towed 155-mm howitzer.

b. Countermortar Radars. Countermortar radars locate mortars by detecting the position of the mortar projectile at two points in space. The data obtained from these two points is inserted into a computer which extrapolates the trajectory of the projectile, determines the origin, and reads out the hostile mortar horizontal coordinates location.

- (1) *Organization.* One countermortar radar section is organic to each of the direct support 105- or 155-mm battalions in the infantry, mechanized, armored, airborne, and airmobile divisions. The countermortar radar section is organized to operate 24 hours a day.
- (2) *Missions.*
 - (a) Location of hostile mortars.
 - (b) Location, adjustment, and registration of friendly artillery.
- (3) *Tactical employment.*
 - (a) The direct support battalion commander normally designates the general position area in which the radar section may select positions. Such designations should encompass an area sufficiently large to enable the chief of section to select the actual radar location based on technical considerations affecting the operation of the radar. The radar position should be adjacent to one of the firing batteries. Such a position simplifies communications, facilitates survey and logistics, and enables the section to take advantage of any existing defensive

perimeter. Depending on the mission, terrain, and tactical situation, the radar position area will be located from 2,000 to 4,000 meters behind the forward edge of the battle area. This gives the radar section flexibility of action in both the offense and the defense. During offensive action, the position should be well forward to avoid early displacement.

- (b) The battalion commander also designates the sector of search for the radar. This sector of search will normally coincide with the zone of action of the supported unit. The coordination of the sectors of search of all counterbattery radars within the division is the responsibility of the division artillery S2. For a more detailed discussion of tactical employment and position requirements, see FM 6-161.
- (c) Radar site evaluation charts will be prepared and must be provided to the battalion S2 at the earliest practicable time to facilitate the preparation of the target acquisition capabilities chart.

c. Counterbattery Radar. The counterbattery radar locates artillery weapons and shell bursts by determining the origin or terminus of the trajectory of a projectile by graphic extrapolation based upon radar observations of the projectile in flight.

- (1) *Organization.* One counterbattery radar platoon is organic to each target acquisition battery, field artillery target acquisition battalion. Each platoon consists of two radar sections. Each counterbattery radar section is organized to operate 24 hours a day.
- (2) *Missions.*
 - (a) Location of hostile artillery weapons.
 - (b) Location, adjustment, and registration of friendly artillery.
- (3) *Tactical employment.*
 - (a) The commander of the target acquisition battery designates the general position areas for the bat-

tery's two radar sections. Normally, he will assign positions on both flanks of the zone of responsibility. If possible, these positions should be located near an adjacent unit. Depending on the mission, terrain, and tactical situation, the radar position will be located from 2,000 to 4,000 meters behind the forward edge of the battle area. The battery commander will designate the sector of search for each radar. The final coordination of sectors of search of all counterbattery radars within the corps is the responsibility of the FATAB S3. After being informed of the general areas in which to locate the radar positions, the radar officer or chief of section makes the final selection of the radar position based on tactical and technical considerations. For a more detailed discussion of position requirements, see FM 6-160.

- (b) Radar site evaluation charts will be prepared and must be provided to the FATAB S3 at the earliest practicable time to facilitate the preparation of the target acquisition capabilities chart.

d. Ground Surveillance Radar. Ground surveillance radars detect moving ground targets, thus providing an excellent means of determining enemy activity in the forward battle area. Since the target is moving, the frequency of the reflected energy is slightly different from the transmitted energy. This frequency difference is within the audio range and is amplified to alert the operator that the radar has detected a target. The audio signal is a characteristic of a particular target and further assists the operator in identification. Line of sight conditions must exist between the radar antenna and the target. The ground surveillance radar must be emplaced on a vantage point to exploit its observation capability. Because of this employment, it is susceptible to visual detection. Therefore, it will normally be employed during darkness or periods of reduced visibility. Radar transmissions are also subject to intercept, analysis, and direc-

tion-finding by enemy forces. Electronic security (ELSEC) aspects to be considered are included in FM 32-5.

(1) *Organization.* The target acquisition platoon of the division artillery headquarters and headquarters battery, infantry, mechanized, armored, and airborne divisions includes one surveillance radar section. This section is mobile and airtransportable, and capable of being airlanded in phase II of an airborne operation.

(2) *Missions.*

(a) The detection, location, and identification, by type, of moving ground targets during periods of darkness or reduced visibility.

(b) Vectoring of patrols or combat elements.

(3) *Tactical employment.*

(a) The surveillance radar is used by the artillery to monitor preselected key areas on the battlefield to supplement observation during hours of darkness or reduced visibility. These key areas may be likely avenues of approach or other critical areas. The section reports the time and predetermined grid locations of moving targets. This report may be sent either directly to a firing battery or to an appropriate FDC as directed. The location information is rapidly converted to firing data to facilitate timely interdiction fire on the target.

(b) The general position area in which the radar warrant officer may select positions is designated by the division artillery commander. Such designation is made based on the recommendations of the intelligence officer (S2) and should encompass an area sufficiently large to enable the radar warrant officer or chief of section to select the actual radar site based on technical considerations affecting the operation of the radar. The position should be such as to simplify com-

munications, facilitate survey and logistics, and enable the section to take advantage of any existing defensive perimeter. Depending on the mission, terrain, and tactical situation, the radar position area would be located from 1,000 to 2,000 meters behind the line of contact. This would give the radar section flexibility of action in both the offense and defense. During offensive action, the position should be well forward to avoid early displacement. In the defense, the position should be located farther rearward in a position area designated by the division artillery commander in order to provide depth to the radar operations of the defensive force as a whole. For a more detailed discussion of employment and position requirements, see FM 6-162.

(c) Areas of surveillance or coverage must be reported to the division artillery S2 by the radar section for inclusion in the division target acquisition capabilities chart.

2-4. Sound

a. *General.* Sound ranging is the procedure used to locate the source of a sound wave by measuring the relative times of arrival of the sound wave at several accurately located microphones. Sound ranging has proved to be a productive target acquisition means for locating hostile artillery. Sound ranging locates hostile artillery pieces which are hidden from visual observation. It is a passive device, not subject to electronic countermeasures. It is very effective in fog since it does not require visual observation of the target. On the other hand, mountainous terrain materially affects sound ranging operations, depending on the relative locations of the base and sound sources and the ground contours of the area under consideration. Heavy firing by friendly artillery tends to confuse interpretation of the sound record. Under high wind conditions, sound ranging is ineffective. Sound ranging is not effective in locating nuclear bursts.

b. *Sound Ranging Platoon.*

- (1) *Organization.* Each target acquisition battery of the field artillery target acquisition battalion is authorized one sound ranging platoon. This platoon is completely mobile and can operate 24 hours a day.
- (2) *Missions.* The sound ranging platoon performs three principal missions. They are—
 - (a) Location of hostile artillery.
 - (b) Registration and adjustment of friendly artillery.
 - (c) Collection of battlefield information.
- (3) *Tactical employment.* Sound ranging can be accomplished in both mobile and static warfare. In mobile warfare, sound ranging platoons are employed aggressively in order to provide sustained coverage. Initial installations are usually a hasty base, with expansion to a deliberate base if time permits. Adjustment on active targets is the rule for hasty base operations, rather than the reporting of true coordinate target locations. Sound ranging installations employed in static warfare are usually of the deliberate type. Initial installation may or may not be the hasty base, but expansion to a deliberate installation is always carried out. Corrected locations of targets will be reported to appropriate higher echelon (battery or battalion) according to mission assigned.
 - (a) *Deliberate base.* Six microphones are usually employed in the deliberate base; each microphone must

be located to an accuracy of 1:3,000. Corrected locations of targets are reported and followed by sound ranging adjustment when requested. With a six microphone base, hostile artillery can be located to distances of approximately 20,000 meters. The actual distance is dependent upon the intensity of the sound. Under good sound ranging conditions, locations can be made with accuracies of 0 to 150 meters; however, this accuracy is impaired by high winds. The width of the area of coverage is approximately 10,000 meters. Accuracies are assigned to each location by the sound platoon and should be considered in evaluating the location. From 6 to 8 hours are required to install a deliberate sound base.

- (b) *Hasty base.* When time is not available for installing a deliberate sound base, one of the hasty methods described in FM 6-122 will be used. A hasty base contains four microphones which are installed without benefit of survey. They can be map spotted. Since the sound base is not on a common grid with friendly artillery, corrected locations cannot be reported. However, this type base can accurately adjust friendly fire on hostile batteries. The width of the area of coverage is approximately 6,000 meters. A hasty base can be installed in 1 to 2 hours.

Section II. AERIAL SYSTEMS

2-5. General

Army observation aircraft, depending on type, have the capability to perform day and night visual, photographic, radar, and infrared missions. The particular aircraft to be employed for target acquisition missions is determined by the capabilities and limitations of available aircraft and their sensory devices. The depth into the enemy area to which army

aviation can penetrate depends on the characteristics of available aircraft and the enemy.

a. *Rotary Wing Aircraft.* The load-carrying capacity of the light observation helicopter precludes the mounting of heavy electronic sensor devices, thus limiting its sensor devices to an aerial observer and/or a camera.

b. *Fixed Wing Aircraft.* Army fixed wing aircraft employed in the target acquisition

role are medium observation aircraft. These aircraft have a greater range and speed which make them suitable for target acquisition missions not within the capability of light observation helicopters. They are employed primarily to carry sensor devices not adaptable to light observation helicopters.

2-6. Visual

Air observation provides an important means of target acquisition. It permits locating targets that are defiladed from ground observers and makes observation possible at greater depths into the enemy area. Air observation is accomplished by observers in Army and Air Force aircraft. Under some situations, tactical Air Force aircraft assist in the adjustment of fire of medium and heavy cannon artillery weapons. The tactical Air Force aircraft may also assist in visual and photographic aerial reconnaissance. Army surveillance and observation aircraft are also used to adjust cannon artillery fires. Army aircraft are highly responsive to mission requirements.

2-7. Photographic

a. Various aerial cameras with day/night capability are carried in Army and Air Force manned aircraft.

b. Optical imagery obtained from aerial cameras produces a permanent record of the area observed. A study of aerial photography discloses recent enemy construction, digging, movement, and other activity not discernible to other means of observation. Targets are identified through interpretation by their size, shape, shadow, and tones.

2-8. Radar

a. Airborne radar, principally side-looking airborne radar (SLAR), produces general intelligence records of terrain presentations and/or indications of moving vehicles. The use of radar imagery for stationary target acquisition is limited. Radar imagery is a map-like presentation showing landmasses, streams and water bodies, and built-up areas such as cities, and can be both viewed in flight and preserved on film. A data-link system also enables a ground terminus to view the imagery while it is being produced and to preserve it

on film. Moving target indications reveal densities of activity and traffic patterns. Airborne radar provide acceptable imagery during periods of daylight or darkness and in conditions of light rain, smoke, haze and dust. Radar is susceptible to enemy electronics countermeasures; however, jamming of the radar is extremely difficult because of its operational characteristics.

b. An image interpreter trained in the techniques of extracting information from radar imagery is required for interpretation of airborne radar imagery. The agency requesting radar imagery must advise the interpreter of the intelligence requirements for each mission in order to permit rapid detection and dissemination of desired information from the radar imagery.

2-9. Infrared

a. Airborne passive infrared sensors are carried by medium observation aircraft. These sensors provide an oscilloscope presentation in the aircraft for immediate viewing by an observer, or by means of a data-link simultaneously provide a display at a ground terminus. The infrared sensor system provides the capability, both in the aircraft and at the ground terminus, of preserving the infrared imagery on film in order to provide both detailed and general record imagery.

b. This imagery provides valuable indications of enemy activities. Therefore, information obtained from infrared imagery must be correlated by target acquisition means which can provide target identification and three-dimensional location is sufficient detail and accuracy to permit effective attack by artillery fire.

c. Airborne passive infrared sensors provide for point target identification, route reconnaissance, and limited area surveillance. These devices are invulnerable to electronic countermeasures but are susceptible to spoofing. Rain, hail, smoke, dust, and fog reduce infrared sensor effectiveness. These sensors may be used in daylight operations but effectiveness is greatly reduced. Tests indicate that these sensors are most useful when employed on clear dark nights.

d. As with radar imagery, a specialist trained in the techniques of extracting infor-

mation from infrared imagery is required. The agency requesting infrared imagery must submit sufficient data on the requirements for

specific information desired to permit the image interpreter to properly analyze the infrared imagery obtained.

CHAPTER 3

TARGET ACQUISITION PLANNING AND COORDINATION

3-1. General

a. Target information is collected by continuous planning and systematic direction of the collection effort. Effective utilization of the sources and agencies available for the collection of target information depends on the artillery S2 and FATAB S3 having a knowledge of their capabilities and limitations. In the course of target acquisition, much intelligence information is gathered. This information is transmitted by the artillery S2 to the supported force S2 (G2) without delay. Emphasis is placed on the rapid and free flow of information between these two agencies.

b. Target acquisition devices serve the force commander by giving him a near 24-hour, all-weather target acquisition capability; increased accuracy of range and azimuth determinations; and increased ability to observe beyond enemy lines.

c. Full exploitation of artillery firepower available to the commander depends on the number and type of target acquisition devices available and the manner in which they are employed.

3-2. Planning

a. In the initial stages of target acquisition planning, some portions of the plan may be based on assumptions concerning our own forces and the capabilities of the enemy. As additional information becomes available, changes are made to conform to the actual situation. These changes will require corresponding changes in the plan as it is being evolved. The required flexibility must be insured by simplicity of procedures in disseminating information and by coordination among all staff sections engaged in the planning. The final plan must be flexible to accommodate

changes in the friendly or enemy situation as they develop.

b. Higher echelons are responsible for providing information and instructions to subordinate units at the earliest possible time by means of briefings, orders, and directives. At successive echelons, the plan is expanded to include the details required for that particular echelon. Coordination between senior and subordinate echelons through conferences and visits during the planning stage insures that no problems are overlooked and that solutions are determined promptly.

c. The artillery S2, after making a study of the collection worksheet, observation plans, patrol plans, and the intelligence estimate, evaluates the suspect target areas and establishes priorities of observation. The S2 then compares the requirements with the capabilities and issues appropriate requests to subordinate target acquisition units and to higher headquarters. Upon receipt of the capabilities charts from assigned and subordinate units, the S2 prepares a consolidated capabilities chart. Analysis of this chart indicates any coordination necessary to insure maximum coverage of the area of operation. In the target acquisition battalion, the S3 rather than the S2, is the principal staff officer for coordination of the target acquisition effort. The FATAB S3 assigns general areas of operation to the batteries based upon the corps operations plan. He designates priorities for specific suspect areas to the batteries for primary and alternate zones of observation. The S3 consolidates the battery capabilities charts into a battalion capabilities chart and forwards copies to corps artillery and the supported units.

d. Early in the planning stage of an operation, a list containing suspect target areas and

potential targets suitable for nuclear attack is developed. Such factors as the mission, enemy intelligence, characteristics of the area of operation, and enemy tactics and practices are studied to select probable target areas. The collection effort insures a systematic day-and-night, all-weather observation to detect potential targets. Areas of particular importance to operational plans are subjected to intensive observation.

e. The collection effort is then directed toward securing information to verify, identify, locate accurately, or disprove the presence of suspected targets by target acquisition means. This is accomplished by assigning suitable tasks to the various collection agencies. Expanded frontages and depths will require intensified planning and maximum use of available target acquisition devices.

f. Each subordinate unit involved in the operation prepares its own plan, based upon the plan of operation. All target acquisition means are integrated to provide complete coverage of the commander's area of influence.

g. When orders and requests for specific information are assigned, the capabilities of the target acquisition means available to the collection agencies are considered. For example, the ground surveillance radar section cannot be asked to locate a stationary target.

h. Target acquisition capability overlays (app B) are submitted by all target acquisition agencies. Without these plans, coordination of the collection effort is handicapped. For example, without the target acquisition plans and overlays of subordinate units, gaps in the target acquisition coverage of the corps or division area may not be detected.

3-3. Coordination

a. The collection worksheet, observation plans, air reconnaissance plans, and patrol plans facilitate the coordination of the target acquisition effort. To insure timeliness in target acquisition for the employment of nuclear, chemical, or biological weapons, subordinate commands may be required to report information directly to the tactical operations center. This direct reporting is limited to specified items of information.

b. The target acquisition plan and instructions for coordination of the target acquisition

effort may be issued orally, in written fragmentary form in the force operation order, in the intelligence annex, or as an appendix to the intelligence annex. For an example of a corps artillery target acquisition plan, see appendix B.

3-4. Direct Support Artillery Battalion

a. After receiving information of the enemy and recommendations from the division artillery S2, the direct support artillery battalion commander selects the general position area in which the countermortar radar is to be employed. This area should be large enough to enable the radar warrant officer to select the actual radar position, based on technical considerations affecting the operation of the radar. In addition, the battalion CO designates the sector of search for the radar if not previously designated by higher authority. This sector of search will normally coincide with the zone of action of the supported unit.

b. Prior to occupying the OP's or joining his maneuver company, the FO receives any special instructions that the S2 may have, such as particular areas to keep under surveillance and what is suspected of being in these areas. Forward observers (FO's) select their OP's in the zone designated by the appropriate artillery liaison officer with the supported unit. This is done to insure observation within the zone of action of the supported unit. Forward observers will prepare visibility diagrams for their OP and submit these to the liaison officer for forwarding to the battalion S2.

c. Upon receiving the visibility diagrams from the forward observers and the surveyed location and site evaluation charts of the radar, the battalion S2 prepares a battalion target acquisition capabilities chart consisting of consolidated visibility diagrams of the OP's and a site evaluation chart of the countermortar radar. One copy of the battalion target acquisition capabilities chart (app B) is forwarded to the division artillery S2 for integration into the division artillery capabilities chart.

3-5. Division Artillery

a. Based on division level requirements established by the division G2, the division artillery S2 determines the location of suspect

areas and decides which devices are most appropriate for providing surveillance of each of the suspect areas. He maintains continuous coordination with the division G2 in the determination of priorities of effort. He then issues proper instructions to the direct support battalion S2's and to the target acquisition platoon of the headquarters battery, division artillery. These instructions include proposed general position areas for the countermortar radars and surveillance radar.

b. The division artillery target acquisition platoon prepares a site evaluation chart for their surveillance radar and forwards one copy to the division artillery S2. The division artillery S2 then consolidates the site evaluation and visibility charts from the direct support battalion and the division artillery target acquisition platoon. One copy of this consolidated capability chart is forwarded to the corps artillery S2 (app B).

3-6. Corps Artillery

a. After making a study of the collection worksheet, observation plans, air reconnaissance plans, and patrol plans, the corps artillery S2 determines the number and location of suspect target areas and the priority of the areas in which targets are suspected. He then

balances the requirements with the capabilities and makes appropriate allocations at the briefing of the division artillery S2's and the field artillery target acquisition battalion S3. The corps artillery S2 consolidates the capabilities charts submitted by these organizations into a corps artillery capabilities chart (app B). A study of this chart indicates any changes necessary to insure complete coverage of the corps front.

b. After the briefing by the corps artillery S2, the FATAB S3 assigns general areas of operation to the target acquisition batteries. He also designates specific suspect areas on which to concentrate in order to locate enemy targets. The batteries are required to submit capabilities charts with visibility charts from the flash platoons. The FATAB S3 maintains a battalion capabilities chart and forwards one copy to the corps artillery S2. The FATAB operations and intelligence section acts as a correlating center for all target locations and target information produced by agencies within the battalion.

3-7. Army Artillery

Much of the information used by the army artillery officer in developing suspect target area locations is provided by the Army G2.

CHAPTER 4

ARTILLERY INTELLIGENCE

Section I. COLLECTION OF TARGET INFORMATION

4-1. General

Artillery target intelligence is knowledge acquired through the collection, processing, and dissemination of all information pertaining to potential or actual targets. Target acquisition agencies are primarily concerned with timely recognition, accurate determination of characteristics, and prompt reporting of the location of targets whose destruction or neutralization will assist the supported unit in accomplishing its mission. Target acquisition agencies are also concerned with observation of targets both before and after their attack by fire to collect and report all information of military significance.

4-2. Information

The target acquisition devices available to the commander provide a means of obtaining accurate and timely hostile target locations. These devices must be efficiently and aggressively employed to take full advantage of their inherent capabilities. When fully supported by rapid survey and adequate communications, targets may be accurately located, the locations quickly transmitted and processed with minimum delay, and the necessary fires placed on the targets.

4-3. Radar Locations

Radar is effective in collecting target information of hostile mortar and artillery activities with considerable accuracy, during daylight and darkness. Although radar is seriously affected by adverse weather conditions, it can play a decisive role in neutralizing the enemy's artillery capability. Hostile weapon locations data are quickly processed within the radar system. Because the target is active when a

radar location is made, data is provided to initiate immediate counterbattery fire. The target data obtained from radar locations is used by the artillery S2 and CBIO in the processing of target information and in developing the general target overlay (figs. 4-1 and 4-2).

4-4. Sound and Flash Ranging

When employed to supplement each other, sound and flash bases provide good battlefield coverage of the area immediately forward of the FEBA to a depth of approximately 20 km. The information is collected as soon as the hostile artillery becomes active. The necessary processing to obtain both target information and intelligence data is quickly performed within the sound or flash platoon. To be utilized most effectively, sound and flash locations, like radar locations, should be immediately provided to firing units so that counterbattery action may be taken while the targets are still active. The target information collected is also utilized by the artillery S2 or CBIO in developing the general target overlay (figs. 4-1 and 4-2). (Located in back of manual)

4-5. General Surveillance

The general surveillance of the battle area provided by FATAB and other target acquisition agencies contributes to the total artillery intelligence collection effort. Listening posts, flash OP's, sound OP's, and surveillance radar installations are continuously active in reporting all enemy movement or activities. The information obtained may be considered to be reliable and accurate when reported by trained observers. These reports are timely when full advantage is taken of the communications organic to these agencies (figs. 4-1 and 4-2).

Section II. PROCESSING TARGET INFORMATION

4-6. General

Field artillery target acquisition procedures do not always follow the accepted techniques of processing, recording, evaluation, and interpretation which apply to intelligence procedures in general. In some instances, especially when the target acquisition device operates from forward areas, the complete process occurs within seconds. For example, the processing may involve no more than reading the grid location from dials on the computer, the recording may be accomplished while the information is being transmitted to the firing unit, and the timely evaluation and interpretation may be accomplished with little formality by the firing unit. In this way, artillery fire is placed on the target before the enemy has time to react. In other cases, the complete processing cycle is accomplished by intelligence personnel prior to transmission of the information to the G3 (S3) for action.

4-7. Processing

Processing is the means by which information is transformed into intelligence. (A complete discussion of the intelligence process is found in FM 30-5.) The sequence that applies to processing information into combat intelligence applies also to processing information into artillery intelligence. The three basic elements of processing are recording, evaluation, and interpretation. The evaluation and interpretation of target information is facilitated by recording and plotting the information on appropriate forms, records, and charts. The charts and records used in counterbattery intelligence activities are explained in appendix C.

4-8. Recording

Recording is the systematic arrangement of information to facilitate its processing into intelligence. The recording function supports evaluation and interpretation which are the decisive actions. Unless information is recorded quickly and economically, timely evaluation and interpretation may not be possible. The procedures used in recording should be simple yet adequate to handle the volume of information received. The records used for gen-

eral target information are—

a. *The S2 journal*, a chronological record of events affecting the S2 section. The format and method of recording is as prescribed for a staff section journal (FM 101-5).

b. *The S2 situation map*, a map or photomap of a suitable scale covered with an overlay on which are posted friendly and enemy front-lines, division and corps boundaries, and all available information of the enemy. The map is used for planning harassing and interdiction fires and for developing fire plans to support an attack or defense. Fire plans should be checked against this map and against hostile weapons charts and associated overlays at division and corps levels to insure that all appropriate targets are attacked.

c. *The general target overlay*, an overlay used in conjunction with the S2 situation map on which are plotted all enemy locations determined to be targets.

d. *The general target file*, a file in which a card is kept for each target located, with the exception of counterbattery locations. The complete history of the target is recorded on this card. This file enables the S2 to correlate reports of enemy activity at a given location. The target file card is also useful in the examination of overrun positions to determine the effectiveness of friendly fires and discern enemy tactics and techniques of employment. The Hostile Battery File (Mortar) (DA Form 2186-R) (fig. 4-3) will be used for this purpose. DA Form 2186-R (image size: 9 9/10" x 7") will be reproduced locally on 10½" by 8" card.

e. The CBIO maintains certain forms and records which assist him in performing counterbattery functions. These forms and records, which are listed in (1) through (7) below, are discussed in detail in appendix C.

- (1) The artillery counterfire information form (ACIF).
- (2) The counterbattery intelligence map.
- (3) The hostile weapons chart.
- (4) The suspect location overlay.
- (5) The shelling report (SHELREP) overlay.

DA FORM 2186-R, 1 Nov 67

Edition of 1 Jul 62, is obsolete.

Figure 4-3. Hostile Battery File (Mortar) Card (DA Form 2186-R).

(6) The roving gun location overlay.

(7) The hostile battery file (mortar).

f. In the field artillery target acquisition battalion, all target locations obtained by sound, flash, and radar are recorded on DA Form 6-6 (Record of Sound, Flash, and Radar Locations).

4-9. Evaluation

Evaluation is defined as the appraisal of an item of information to determine its pertinence, reliability, and accuracy.

a. *Pertinence.* Immediately after its receipt by the S2, information is examined to determine its relevancy and value. Is it information of the enemy or of the characteristics of the area of operations? Is it information of value to the unit or to higher, lower, or adjacent units? Is it needed immediately and, if so, by whom? Is it of future value? These questions should be answered in estimating the pertinence of the information.

b. *Reliability.* The reliability of the source and the collecting agency must be examined before the information can be evaluated. To what extent is the source or agency accurate and reliable? Has the agency sufficient training, experience, and ability to report accurately the information in question? Could the information actually have been obtained under conditions existing at the time (time, space, means

employed, and visibility)? These questions should be answered in estimating reliability of the source and the collecting agency.

c. *Accuracy.* The accuracy of the information must be examined separately from the reliability of the source of collecting agency. Is the purported fact or event at all possible? Does it agree or disagree with known facts? Can the information be confirmed or corroborated by a different source or agency? If the information is at variance with other information and the conflicting items cannot be reconciled, which information is more likely to be correct? These questions should be answered in estimating the accuracy of each item of information.

4-10. Interpretation

a. Interpretation is the final step in the processing sequence. The evaluated information is analyzed to determine its significance with respect to information or intelligence on hand, and conclusions are drawn therefrom. Correct interpretation will lead to accurate conclusions concerning target information which is essential to the employment of effective fire support. Interpretation of target information is particularly significant when nuclear fire is contemplated or employed.

b. A detailed discussion of target analysis procedures is contained in FM 6-20-2.

Section III. IMAGERY

4-11. General

Imagery includes the graphical representation of terrain and may be portrayed as a photograph, infrared image, radar image, or scope portrayal. Three types of imagery are of importance to artillery target acquisition.

a. *Radar Strip Map Imagery.* Imagery provides information of the topography of the area being observed as well as cultural features such as roads, railroads, airfields, and built-up areas. The moving target feature provides important data on the movement of objects in the area being viewed. By comparing fixed object and moving target displays, the interpreter can determine the general type of traffic observed. Imagery obtained from cur-

rent aerial radar equipment does not permit identification of the type, direction, or speed of movement, or of the quantity of vehicles, railroad cars, or other targets; however, with two consecutive runs, comparison may determine direction and velocity of movement.

b. *Infrared Imagery.* Infrared imagery is portrayed on photographic filmstrip and displays "hot" ground objects and terrain. "Hot" objects are those objects which emit infrared radiations. Variations in the temperature of objects and terrain produce the terrain imagery. Proper interpretation is dependent upon the interpreter's knowledge of the relationship between what has been viewed by the sensor and what appears on the recording.

c. *Photography.* Photographic imagery is portrayed as still pictures singly or in series, each picture representing a single exposure of the camera film. They are true black and white photographic prints and depict the terrain and all visible objects as they appeared at the time of exposure. Comparison of photos taken at different times will disclose changes in location, or addition of material objects.

4-12. Interpretation

Image interpreters are required for interpretation of conventional photography, infrared, and radar imagery. They are supplied by the

military intelligence units attached to corps, divisions, and armored cavalry regiments.

4-13. Requests for Imagery

Requests for imagery are normally routed through the G2/S2 Air and must include the following information:

- a. Area to be covered.
- b. Specific information desired.
- c. Prominent terrain features to be included for use as control points in interpretation.
- d. Any special instruction for interpreters in the case of radar and infrared imagery.

Section IV. DISSEMINATION AND USE OF ARTILLERY INTELLIGENCE

4-14. General

The artillery intelligence cycle is culminated when the intelligence is disseminated and put to use. Since artillery intelligence is a part of combat intelligence, it must be forwarded promptly to the appropriate G2.

4-15. Dissemination

Disseminated information should be pertinent, concise, clear, accurate, and timely. The recipient should not be burdened with unnecessary or irrelevant details or with illogically presented information.

a. Artillery intelligence is disseminated by the most suitable means available; e.g., radio, wire, written messages, conferences, or intelligence documents. Artillery communication channels are normally used for the transmission of artillery intelligence.

b. Representatives of fire support agencies and of the supported unit transmit all available information to their parent units.

4-16. Intelligence Documents

The intelligence documents commonly used for disseminating combat intelligence and information are discussed in FM 30-5. Target information may also be disseminated by the following means:

a. *Hostile Battery, Mortar, and Flak Lists.* Lists of hostile locations are compiled for all interested agencies. Confirmed and suspect locations are listed separately. The lists are numbered, dated, and published at the direction of

the appropriate commander and are kept current by the publication of additions, deletions, or changes in paragraph 5 of the artillery intelligence bulletin or in annexes to the periodic intelligence report of the supported force.

b. *Artillery Intelligence and Information Bulletins.* Artillery intelligence bulletins may be published at the direction of the corps artillery and division artillery commanders. Artillery information bulletins are published by the artillery commander (officer) at army or theater army levels.

c. *Target Summaries.* Target summaries consist of hostile battery, mortar and flak lists, and general target locations compiled from the latest available information. Complete target summaries are numbered, dated, and published at the direction of the appropriate commander. They are kept up to date by the publication of additions, deletions, and changes in paragraph 5 of the artillery intelligence bulletin or in annexes to the periodic intelligence report of the supported force. The target summary may indicate a recommended priority for each target.

d. *Artillery Periodic Intelligence Report.* The artillery periodic intelligence reports (corps and army artillery only) summarize information concerning the enemy capabilities, situation, and operations, and the weather and terrain. A separate artillery periodic intelligence report may be prepared, or the information normally included therein may be incorporated in the periodic intelligence report of

the supported force. The period of time to be covered in the report is specified by higher headquarters or by the appropriate commander in the absence of instructions. Normally, the report covers a 24-hour period.

4-17. Use of Artillery Intelligence

a. Force G2. The force G2 uses artillery intelligence in connection with intelligence from other sources to determine the enemy's capabilities and courses of action, and the relative probability of the enemy's adopting the various courses of action.

b. Artillery Use. Artillery intelligence is used by the artillery commander to assist in the destruction or neutralization of located targets. In his principal task of advising the force commander on fire support, the artillery commander uses artillery intelligence—

- (1) As a factor in recommending allocation of artillery to lower echelons.
- (2) As a factor in requesting additional artillery from higher headquarters.
- (3) To assist the commander in the disposition of friendly artillery and in determining the organization for combat.
- (4) To assist in recommending the required supply rate to be requested from higher headquarters for planned operations.
- (5) As a vital consideration, along with the mission of the force, in recommending the available supply rate of ammunition for subordinate artillery echelons.
- (6) In planning future operations.

APPENDIX A

REFERENCES

A-1. Army Regulations

- AR 117-5 Military Mapping and Geodesy.
- AR 320-5 Dictionary of United States Army Terms.

A-2. Field Manuals

- FM 3-10 Employment of Chemical and Biological Agents.
- FM 5-146 Engineer Topographic Units.
- FM 6-2 Artillery Survey.
- FM 6-10 Field Artillery Communications.
- FM 6-15 Artillery Meteorology.
- FM 6-20-1 Field Artillery Tactics.
- FM 6-20-2 Field Artillery Techniques.
- FM 6-120 The Field Artillery Target Acquisition Battalion and Batteries.
- FM 6-122 Artillery Sound Ranging and Flash Ranging.
- FM 6-160 Radar Set, AN/MPQ-10.
- FM 6-161 Radar Set, AN/MPQ-4A.
- FM 6-162 Radar Set, AN/TPS-25.
- FM 21-30 Military Symbols.
- FM 21-40 Chemical, Biological, and Nuclear Defense.
- FM 30-5 Combat Intelligence.
- FM 31-16 Counterguerrilla Operations.
- FM 31-22 U.S. Army Counterinsurgency Forces.
- FM 31-73 Advisor Handbook for Stability Operations.
- (C) FM 32-5 Signal Security (SIGSEC) (U).
- FM 33-1 Psychological Operations—U.S. Army Doctrine.
- FM 41-10 Civil Affairs Operations.
- FM 101-5 Staff Officer's Field Manual, Staff Organization and Procedure.

A-3. Standardization Agreements

- STANAG 2002 Contamination Markers.
- STANAG 2008 Bombing, Shelling and Mortaring Reports.
- STANAG 2029 Method of Describing Ground Locations, Areas and Boundaries.
- STANAG 2103 Report of Enemy Chemical, Biological, and Nuclear Attack.

A-4. Technical Manual

- TM 5-231 Mapping Functions of the Corps of Engineers.

APPENDIX B

TYPICAL TARGET ACQUISITION PLAN

B-1. General

a. The example of a target acquisition plan shown herein is for the guidance of the S2 in preparing the corps artillery portion of the corps observation plan.

b. The corps observation plan, which is prepared by the G2, is an appendix to the intelligence annex. The corps observation plan directs the activities of all corps observation agencies and includes the *artillery target acquisition plan*.

c. The information included in this example may be published as a separate paragraph in the corps observation plan appendix or, if voluminous, may be published as a tab to the appendix. The same format may be used by corps artillery to publish a target acquisition plan which is not to become a part of the corps observation plan. In this last instance, the document is formally disseminated to appropriate artillery units with the corps.

B-2. Typical Artillery Target Acquisition Plan

(Classification)

(Changes from oral orders, if any)

Copy Nr 7
1st Corps Arty
STENINAU (3374) GERMANY
200600 Aug 19____
X7X

TAB C (Artillery Target Acquisition Plan), to Appendix 2, (Observation Plan) to Annex A (Intelligence) to OPOD 6. Map: GERMANY, 1: 50,000 sheets S6, S7, S8.

0-0 LINE. (300100)—(340060)—(380049)—(420023). (See overlay attached.)

1. ZONES OF RESPONSIBILITY

a. Corps artillery.

- (1) 101st Arty Group: As directed by 1st Inf Div Arty.
- (2) 102d Arty Group: Obsn beyond 0-0 line from 22 northing to 34 northing. Coordinate with "B" Btry FATAB.
- (3) 103d Arty Group: Obsn beyond 090 line from 26 northing to 38 northing. Coordinate with "C" Btry FATAB.
- (4) 104th Arty Group: Obsn beyond 0-0 line from 36 northing to 48 northing.

b. Division Artillery: Observation in div Z, south (short of 090 line).

2. GROUND VISUAL OBSERVATION

a. Observation posts.

- (1) Corps artillery: 1st Corps SOP.

(Classification)

(Classification)

(2) Division artillery: As directed by div arty cmdr.

b. Capability chart: 1st Corps SOP. To 1st Corps Artillery not later than 21700 Aug 19_____.

3. RADAR, SOUND AND FLASH

a. Corps artillery.

(1) Special attention to areas indicated on inclosure 1 to tab C (omitted). (When the areas are few in number, list here.)

(2) Radar: As directed by CG, corps arty.

(3) Sound: As directed by CG, corps arty.

(4) Flash: As directed by CG, corps arty.

b. Div arty radar: As directed by div arty cmdr.

4. AIR OBSERVATION

a. Airfields and heliports.

(1) Corps artillery.

(a) Hq, 1st Corps Arty: (321736).

(b) Arty groups: Select and report by 21000 Aug 19_____.
(When known, given location.)

(c) Battalion: Cannon and missile; select and report by 211000 Aug 19_____. (When known, give location.)

b. Surveillance schedule.

(1) Corps artillery.

(a) 101st Arty Group: As directed by 1st Inf Div Arty command. (This group is reinforcing 1st Inf Div Arty.)

(b) 102d Arty Group: Minimum of one aircraft, and observers continually in Z from BMNT—15 minutes to EENT + 30 minutes.

(c) 103d Arty Group: Minimum of two aircraft, and observers continually in Z from BMNT—15 minutes to EENT + 30 minutes.

(d) 104th Arty Group: Minimum of one aircraft, and observers continually in Z.

(e) A01 Mohawk: As directed by corps artillery S2.

(2) Div arty: As directed by div arty comd.

Acknowledge.

Incl:

1. Direct support battalion capability chart (fig B-1)
2. Division artillery capability chart (fig. B-2)
3. Corps artillery capability chart (fig. B-3).

BRAVO

BG

OFFICIAL:

/s/ Snoop
SNOOP
S2

(Classification)

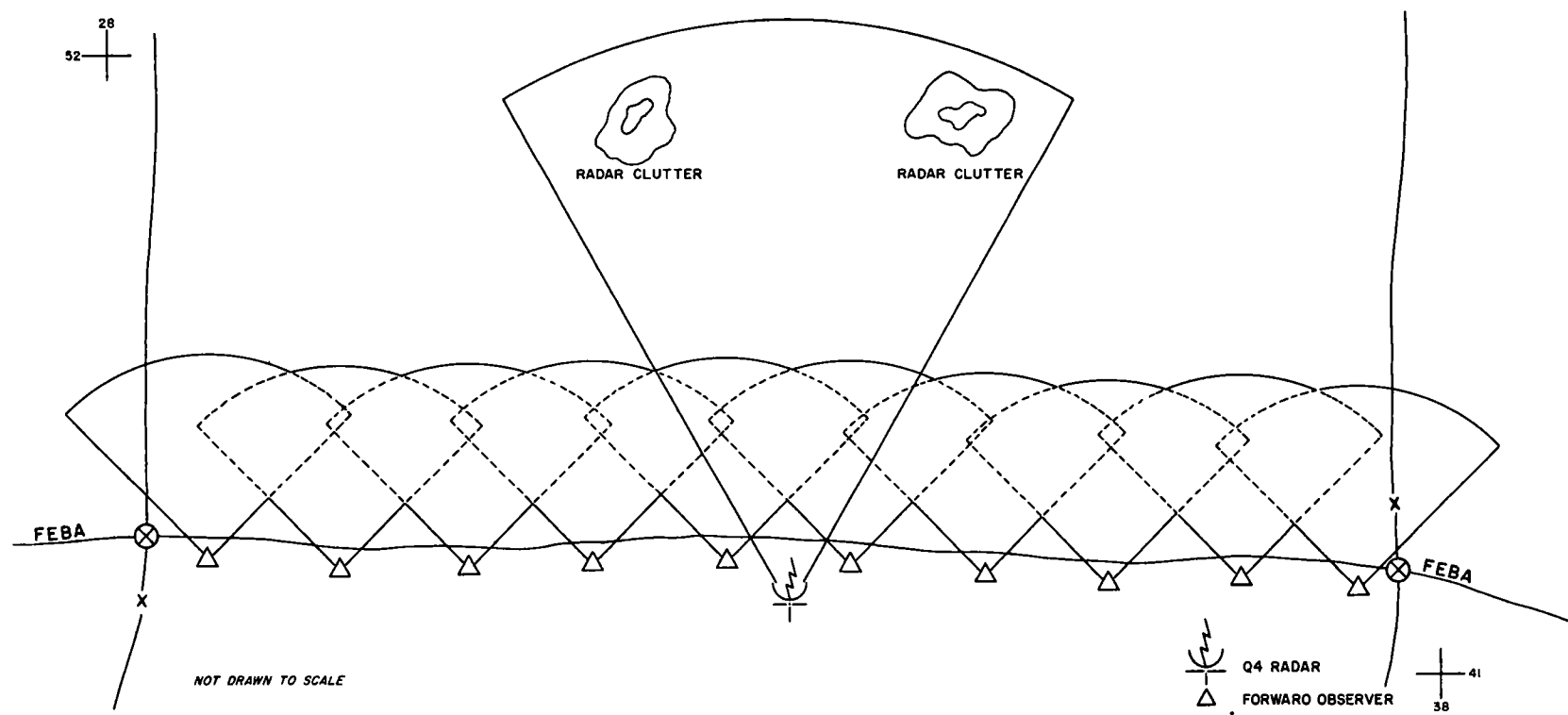


Figure B-1. Direct support battalion capability chart.

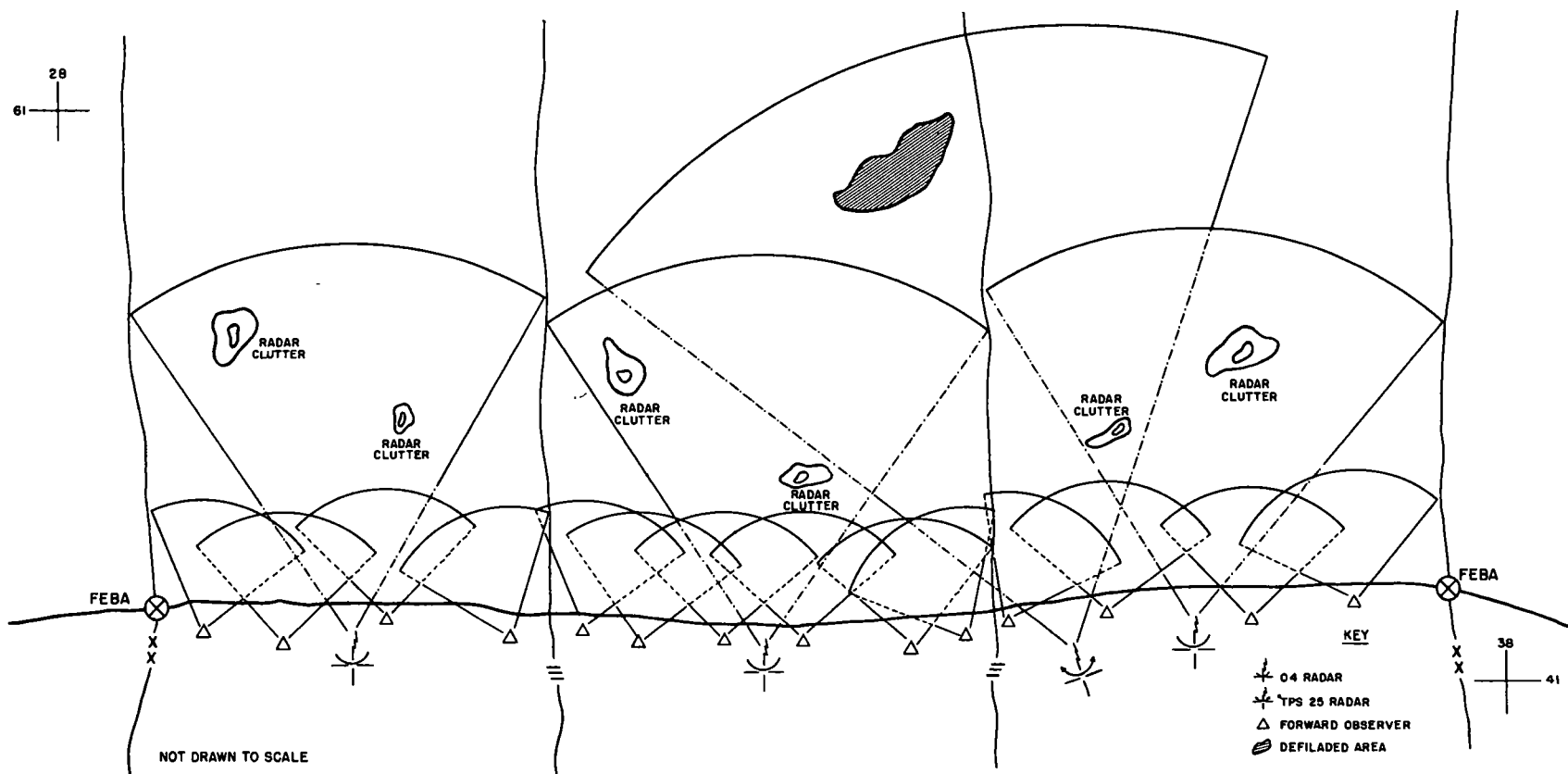


Figure B-2. Division artillery capability chart.

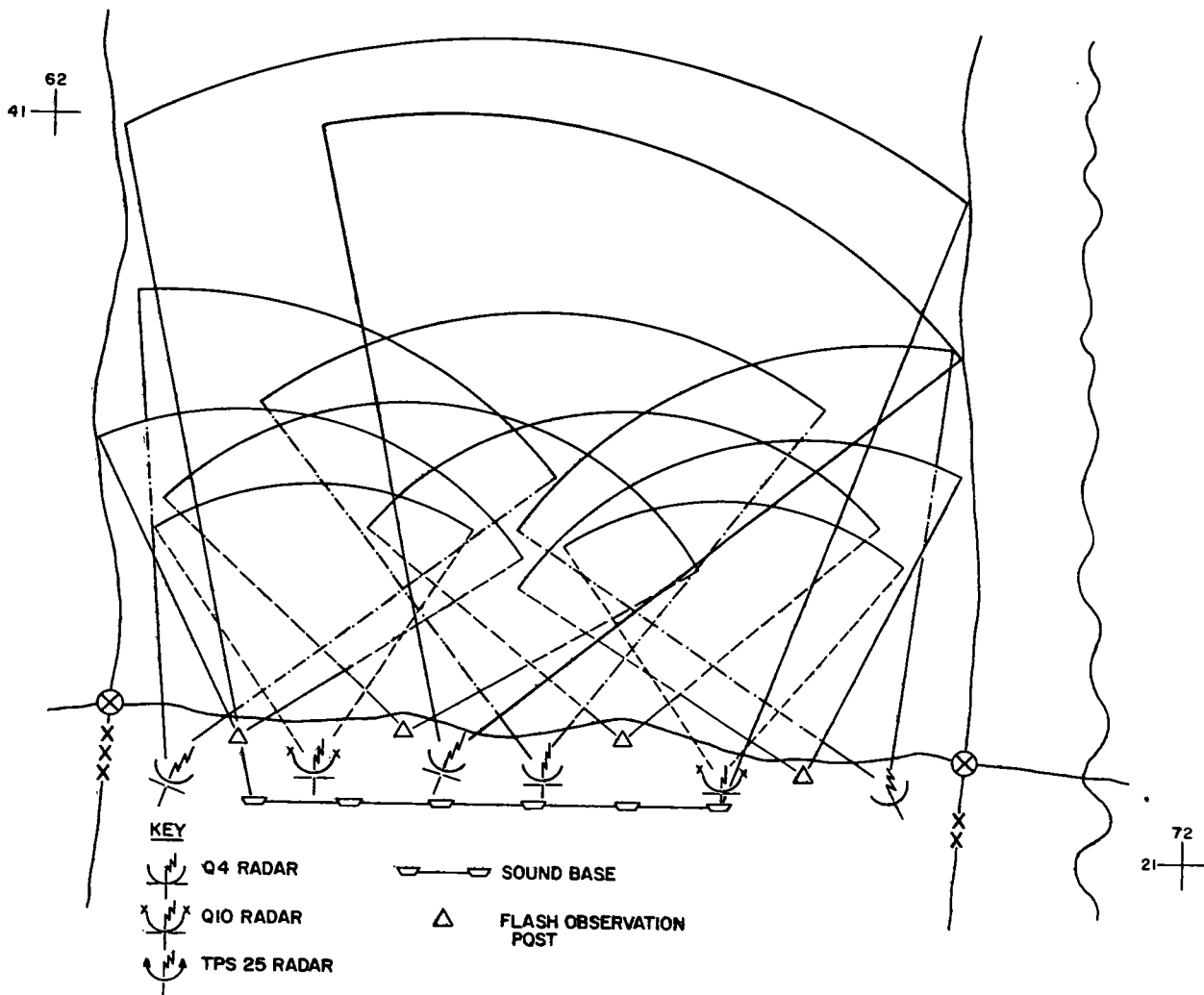


Figure B-3. Corps artillery capability chart.

APPENDIX C

COUNTERBATTERY ACTIVITIES

C-1. General

The term "counterbattery" includes fires on mortars, cannon, rockets, and missiles. Counterbattery intelligence has the objective of gathering complete information pertaining to hostile firing means. In this respect, counterbattery intelligence is more specialized than other phases of military intelligence. Its immediate operational objective is attained when the fire support agencies are provided with sufficient information to properly engage the hostile weapons with effective fires.

a. Counterbattery intelligence serves a broader function when its product is integrated into the whole of the intelligence effort. Important tactical deductions, independent of the operation of attacking hostile weapons, may be derived from positive knowledge of the enemy artillery strength and dispositions.

b. Successful counterbattery intelligence depends on the aggressive and coordinated employment of contributing intelligence agencies and on the systematic recording and evaluation of assembled data.

C-2. Responsibility

a. A clear line of distinction between the functions of the various programs (e.g., counterbattery, counterflak) is not always possible or desirable; therefore, responsibility for a particular program is not fixed upon any one artillery echelon, but is based on the premise that the most appropriate means available will be utilized to locate and attack these targets.

b. In discharging this counterbattery responsibility, an artillery commander is assisted by—

- (1) The S2, who is concerned with all intelligence.
- (2) An assistant S2, counterbattery officer, who produces counterbattery intelligence, to include the location and

identification of hostile weapons, the study of enemy tactics and techniques, and the determination of enemy capabilities and limitations.

- (3) The S3, who utilizes organic, attached, and reinforcing weapons, for the most effective attack of hostile weapons provided by the S2 and his assistants.

C-3. Counterbattery Tactics

In many situations, it is necessary for the commander responsible for counterbattery operations to outline the counterbattery tactics to be followed. The tactics will be the commander's concept of the employment of his fire support in the counterbattery role. The tactics employed are continually reviewed and revised as necessary in accordance with the changing situation.

a. *Definition.* Counterbattery tactics is an expression by the artillery commander of his plan for employing the artillery to attack hostile weapons in support of the force commander's mission and plan of maneuver or scheme of defense. It may include the type of counterbattery program to be executed, standard methods of attack of specific targets, and the artillery commander's criteria as to what should constitute a suspect weapon location and what should constitute a confirmed weapon location for the specific tactical situation.

b. *Description of Counterbattery Tactics.* There are three conditions which describe counterbattery tactics to be employed.

- (1) An *active* status, which is the delivery of fire on all hostile weapons as soon as their locations are confirmed.
- (2) A *silent* status, which is the withholding of fire in order to provide time for the collection of counterbat-

tery intelligence information by all available means so that a more effective program can be prepared.

- (3) A *semiactive* status, which is a compromise between the active and silent status. For example, such a status may direct a silent status except for the delivery of fire on hostile locations whose fires are causing damage to friendly elements. Some artillery units may also be required to follow an active status while others follow a silent status in order to avoid disclosing the number or types of artillery units in the force.

c. Considerations Affecting the Counterbattery Tactics. Some of the considerations affecting the determination of the counterbattery tactics are—

- (1) The mission of the supported force.
- (2) A knowledge of the tactics and techniques of employment of the enemy's artillery.
- (3) The amount and types of weapons in the enemy force and the degree to which they are active.
- (4) A knowledge of the enemy's capability for reinforcing his weapons.
- (5) An estimation of our capability to locate enemy weapon positions.
- (6) An estimate of our ability to deliver effective fire on enemy locations by appropriate means.
- (7) A knowledge of the strength, status, and morale of enemy artillery units.
- (8) A knowledge of the intensity or type of fire required to achieve the effect desired upon the enemy weapon locations.
- (9) A knowledge of the enemy capability of locating our fire support and delivering effective fire on our positions.
- (10) A knowledge of the enemy's capability to locate and eliminate our counterbattery and countermortar radar.
- (11) Employment of deception techniques to reduce the enemy's capability for locating our fire support positions.
- (12) A knowledge of the communication systems employed by enemy artillery

commanders and the location of enemy communication installations.

- (13) A knowledge of electronic countermeasures (ECM) which are available to jam radio communication systems employed by enemy artillery.

- (14) Ammunition available to support the counterbattery tactics.

d. Determination of Counterbattery Tactics. The determination and application of the counterbattery tactics must guard against the creation of a standard pattern of friendly artillery fires which will reveal the plan of action to the enemy. A thorough analysis of each situation in the light of the considerations discussed in *c* above should result in the establishment of successful counterbattery tactics. When a semiactive status is selected, the artillery commander should outline his tactics in such detail that subordinate artillery commanders are fully cognizant of the particulars of this status.

C-4. Execution of Counterbattery Fires

a. Hostile batteries should be attacked with surprise fire. Time and ammunition permitting, batteries, once neutralized, should be destroyed by fire. The accuracy of these fires can often be determined by sound, flash, or radar.

b. Because mortars are capable of displacing rapidly and frequently, an active hostile mortar should normally be engaged as soon as it has been accurately located and adequately described to insure delivery of effective counterfire.

C-5. Evaluation of Counterbattery Fires

During the course of operations and after enemy territory has been overrun, the effect of counterbattery fires on hostile weapon locations should be evaluated. This evaluation will facilitate future counterbattery operations by revealing the—

- a.* Average number of weapons in a unit.
- b.* Use of alternate positions.
- c.* Typical location and organization of weapon positions.
- d.* Accuracy and effectiveness of counterbattery fires.
- e.* Efficiency of the counterbattery intelligence system.

C-6. Communication

Since speed is essential to counterbattery action, the organization for operation must include an efficient means of secure communication for the flow of information and for calling on the most suitable weapons for fire. In most instances, the normal communication systems will suffice, but additional facilities may become necessary for the rapid transmission of information. Artillery communication channels are normally utilized for counterbattery activities. For additional information on communications, see FM 6-10.

C-7. Terms

Certain terms commonly used in processing target information require explanation. The terms to be used and the criteria for their use are determined by the commander. The terrain, the enemy's employment of artillery, the weather, and characteristics of enemy weapons are considered. Examples of terms that may be required and their definitions are—

a. A *roving gun location* is a location from which a roving gun is fired or from which a roving gun is suspected of being fired.

b. An *artillery (mortar) (missile) location* is an area which is known or suspected of containing enemy artillery weapons (mortars) (missiles).

c. A *suspect weapon location* is a location which there is doubt as to whether it is occupied, unoccupied, or a dummy position.

d. A *confirmed weapon location* is an enemy position the existence and location of which has been verified by sufficient evidence to justify the conclusion that it is occupied by an enemy weapon.

e. A *battery* is an enemy artillery position in which is found any of the following:

- (1) Two or more light or medium artillery weapons.
- (2) One or more heavy or very heavy artillery weapons.
- (3) One or more artillery missiles (launchers).

C-8. Counterbattery Forms and Records

The following forms and records are maintained by the counterbattery officer to assist him in performing counterbattery functions.

a. The *Artillery Counterfire Information*, form (ACIF) (DA Form 2185-R) (fig. C-1) is used in recording and transmitting shelling reports (SHELREP) and information relative to hostile battery (missile) (mortar) positions. Information from this form is plotted on the hostile weapons chart, the suspect location overlay, or the SHELREP overlay. (DA Form 2185-R (image size: 9 9/10" x 7") will be reproduced locally on 10 1/2- by 8-inch paper.

b. The *counterbattery intelligence map* is a contour map or an aerial mosaic of suitable scale and accuracy. A contour map is preferred. This map is covered with an overlay on which are plotted appropriate unit boundaries, friendly frontlines, and all *confirmed and suspect* hostile artillery (mortar) (missile) locations.

c. The *hostile weapons chart* is a map, photomap, or grid sheet of suitable scale and accuracy on which unit boundaries, friendly frontlines, and all *confirmed* artillery (missile) (mortar) locations or batteries are plotted.

d. The *suspect location overlay* is attached to the hostile weapons chart and is used in conjunction with that chart to show suspect locations.

e. The *SHELREP overlay* is also attached to the hostile weapons chart and is used in conjunction with that chart and other attached overlays. On it are plotted the areas shelled and rays indicating the direction toward enemy weapon activity. The information on this overlay pertaining to shelled areas is particularly valuable in preparing the material for inclusion in the periodic intelligence report. The overlay may be changed as necessary, or may be changed every 24 hours, to coincide with the period covered by the periodic intelligence report.

f. The *roving gun location overlay*, when used, is attached to the hostile weapon chart and used in conjunction with that chart to show roving gun activity.

g. The *hostile (battery) (mortar) (missile) file* is a card file in which is kept a hostile weapons file card (DA Form 2186-R) (fig. 4-3) for each suspect artillery (mortar) (missile) location, roving gun location, and confirmed artillery (missile) (mortar) or battery

ARTILLERY COUNTERFIRE INFORMATION (FM 6-121)										
RECEIVED BY		FROM			TIME		NUMBER			
SECTION I - BOMREP, SHELREP OR MORTREP (Cross out items not applicable.)										
UNIT OF ORIGIN (Current call sign, address group or code name)	POSITION OF OBSERVER (Encode if Hq or important OP or F gives info on location)	DIRECTION Measured clockwise from GRID NORTH in degrees or mils (state which) of FLASH, SOUND or GROOVE of SHELL (state which) (Omit for aircraft)	TIME FROM	TIME TO	AREA BOMBED SHELLED OR MORTARED (Grid ref-- in CLEAR) or (Dir to impact in degrees or mils, dis in meters - - ENCODED)	NO. AND NATURE OF GUNS (Mortar, rocket launchers, aircraft, or other methods of delivery)	NATURE OF FIRE (Registration, bombardment, harassing, etc.)	NO., TYPE, AND CAL. (State whether measured or assumed) of SHELLS, ROCKETS, MISSILES, OR BOMBS	TIME OF FLASH TO BANG (Omit for aircraft)	DAMAGE (Encode if required)
a	b	c	d	e	f	g	h	i	j	k
SECTION II - LOCATION OF HOSTILE WEAPONS						SECTION III - COUNTERFIRE ACTION				
UNIT OF ORIGIN AND TIME	GRID REF AND ACCURACY	MEANS OF LOCATING	TIME ACTIVE	NO. AND NATURE OF GUNS (Mortar, rocket launchers, aircraft, or other methods of delivery)	REMARKS	TIME C/FIRE	FIRE BY	NO. OF RD FUZE AND PROJECTILE	REMARKS (effect)	
l	m	n	o	p	q	r	s	t	u	

DA FORM 2185-R, 1 Nov 67

(Conforms with STANAG 2008.)

Edition of 1 Nov 58, is obsolete.

Figure C-1. Artillery Counterfire Information (ACIF).

location. The location designation and its complete history are recorded on this card. Confirmed locations, suspect locations, and roving gun locations are filed in separate sections.

C-9. Plotting Targets

The employment of a standard notational system facilitates the integration of information received in a variety of forms from numerous different agencies into a flexible, simple, and usable form. Although experience or the requirements of a given situation may indicate improvisation, the following system permits the recording of the bulk of information normally received in the S2 sections:

a. Plot Description. Each location is plotted on the appropriate maps, charts, or overlays. The plot should include the target number; time and date the weapon(s) was last reported active; description of the target, such as the number, caliber, and type of weapons; and the reporting source of agencies.

b. Color Code. Colors may be used in plotting to permit selection of targets according to accuracy of location. For example, accuracy may be indicated as follows:

Red—accuracy of 100 meters or less

Blue—accuracy between 101 and 200 meters

Brown—accuracy between 201 and 300 meters

Green—accuracy of 301 meters or over

c. Identification of Reporting Source or Agency. The abbreviations most commonly used to identify the reporting source or agency are—

SR—Sound ranging

RR—Radar

FR—Flash ranging

Z—Shelling reports ((g) for crater analysis; (f) for flash observation)

TAF—Tactical Air Force observer

PW—Prisoner of war

AO—Air observer

OP—Ground observer

II—Image interpreter

d. Plot Designation. Targets are reported by target number. Plots are placed on the suspect location overlay until confirmed. When a location is confirmed, the plot is removed from the suspect location overlay, plotted on the hostile

weapons chart, and the letter C (confirmed) is added to the target number. The corresponding card in the hostile artillery file is changed accordingly.

e. Description of Target. An abbreviated description of the target's composition is included as a part of the plot.

- (1) The description of hostile artillery locations includes the number, caliber (or size), and type of weapon(s), for example—

4/M/H ----- Four medium howitzers

1/?/? ----- One weapon; caliber (or size) and type doubtful.

3/H/? ----- Three heavy weapons, type doubtful.

4/150/G ----- Four 150-mm guns (show exact size or caliber when known).

1/MR/MSL ----- One medium-range missile (show exact size when known).

- (2) Mortar locations are described as to the number and size of mortars therein: for example—

4/Lt ----- Four light mortars

1/? ----- One mortar, size doubtful

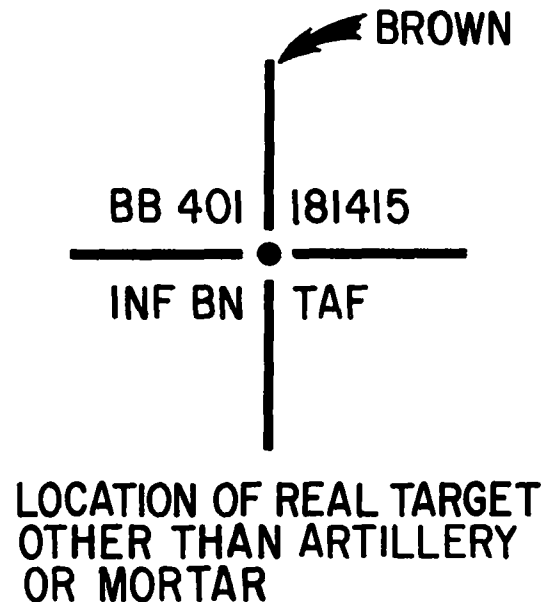
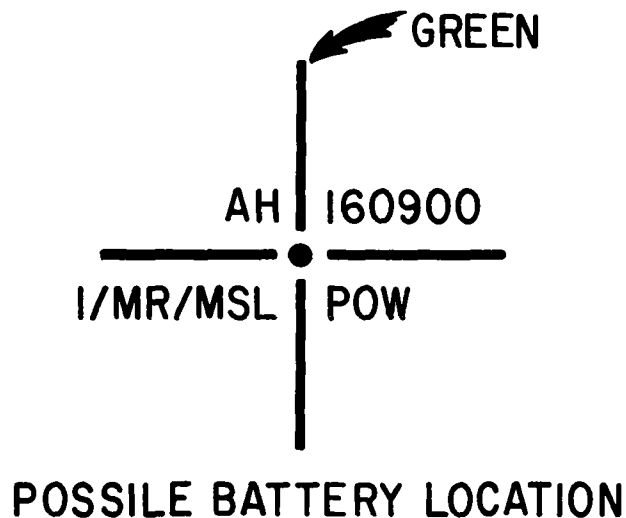
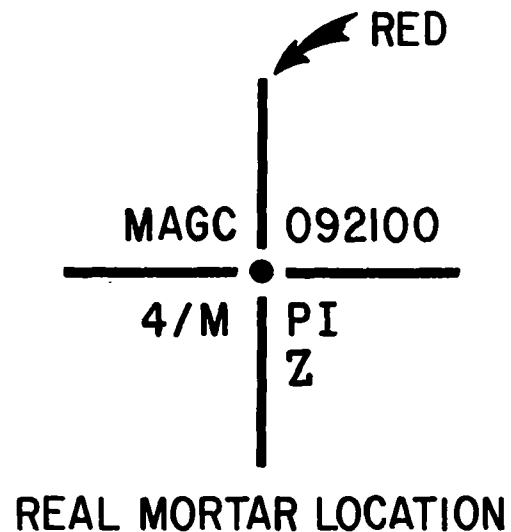
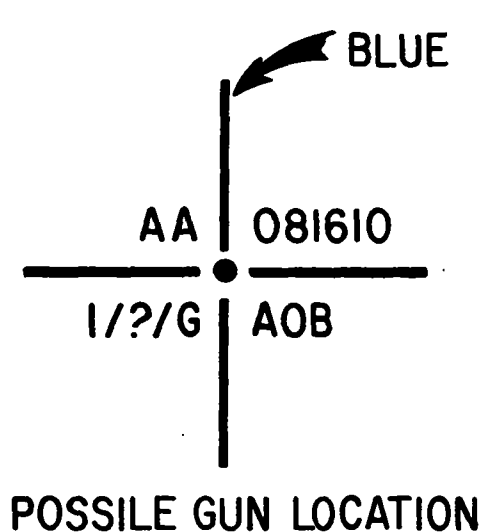
1/Hv ----- One heavy mortar

- (3) The criteria for classifying enemy artillery and mortars should be established by the corps artillery commander, using order-of-battle intelligence and appropriate information of the enemy as a guide. The larger enemy mortars may be classified as artillery.

- (4) General target locations are described by an appropriate military symbol (FM 21-30) or abbreviation or by improvising some other intelligible notation.

f. Completed Plot. The completed plot (fig. C-2) consists of the basic symbol, with notations placed in each quadrant. A commonly used system for entering notations is given below:

- (1) Upper left—target number assigned to the location.
- (2) Upper right—date and time last active or reported. (If derived from photo-interpretation report, the date and time the photo was taken are shown.)



NOTE: COLORS REFLECT ACCURACY OF LOCATION. FOR
COLOR CODE SEE PAGE B-9

Figure C-2. Target plot.

- (3) Lower right—agency reporting. More than one may be shown.
- (4) Lower left—description of target.
- g. Changes in Target Status.* The plots of

targets are changed to conform to the target's known status. For example, the plot may be removed from the suspect location overlay and replotted on the hostile battery chart when the

location is confirmed (*d* above). When a target location is reported by a reliable source to be vacated, its plot is removed from the general target overlay or the hostile weapons chart and, in the case of artillery (mortars), the plot is reentered on the suspect location overlay. Regardless of the type of target, the card of the location now reported to be vacant is retained in the suspect section of the appropriate target file for reference if the location is reoccupied and to facilitate poststrike analysis.

C-10. Shelling Reports

a. Whenever and wherever hostile shelling (cannon, missile, or mortar) or hostile bombing is observed, it must be reported without delay to the headquarters best equipped to evaluate and act upon the information. This report is forwarded in accordance with the format and procedure presented in appendix E.

b. Shelling and bombing reports form the basis of efficient counteraction to enemy fire. In addition to providing information that facilitates the initial location of hostile weapons, shelling and bombing reports further aid counterbattery, countermortar, and air defense operations by—

- (1) Indicating *when* enemy weapons are firing.
- (2) Indicating *which* weapons or aircraft are active.
- (3) Indicating the *number, caliber (or size), and type* of active weapons.
- (4) Reporting the *effectiveness* and indicating the *purpose* of enemy fire.
- (5) Helping to define enemy fire *capabilities*.
- (6) Furnishing information which may confirm target locations.

C-11. Plotting Shelling Reports

a. Shelling reports are plotted on the SHELREP overlay (fig. C-3) as they are received.

- (1) The basic symbol used in plotting a shelling report is a ray whose origin is at the observer's reported location. However, if the shelling report is based on measurements taken at the crater or furrow, the area shelled

((3) below) is the origin of the ray. For "flash-bang" reports, the rays are drawn with tick marks which correspond to the ranges determined from reported time intervals.

- (2) To permit rejection of false intersections, the rays may be drawn according to a color code. For example—

Red—heavy weapons (caliber or size)

Blue—medium weapons (caliber or size)

Green—light weapons (caliber or size)

Brown—missiles (size or short-, medium-, or long-range)

Black—unknown

- (3) When the location of the area shelled is reported, it may also be shown on the shelling report overlay. Notations concerning the number and caliber (or size) of the shells fired, the nature of the fire, and the time fired are desirable.

- (4) Notations are placed on the ray to identify the SHELREP. These notations normally include the time of firing; the ACIF number; information concerning the number, caliber (or size), and type of weapons; and the flash-bang distance if reported in item J, ACIF.

b. SHELREP's are evaluated on receipt as to accuracy and reliability. When the SHELREP is plotted on the SHELREP overlay, it is considered in conjunction with the hostile weapons chart, attached overlays, and any other pertinent information available. If the SHELREP establishes the activity of a hostile location an entry is made on the appropriate target file card and hostile weapons chart. When appropriate, the information is passed to the S3 for information and necessary action. When the azimuth or location is unrelated to any plotted location, a careful study is made taking into account weapon type and caliber (or size) to determine likely tactical positions. Intelligence agencies may be directed to obtain and analyze further information in these areas.

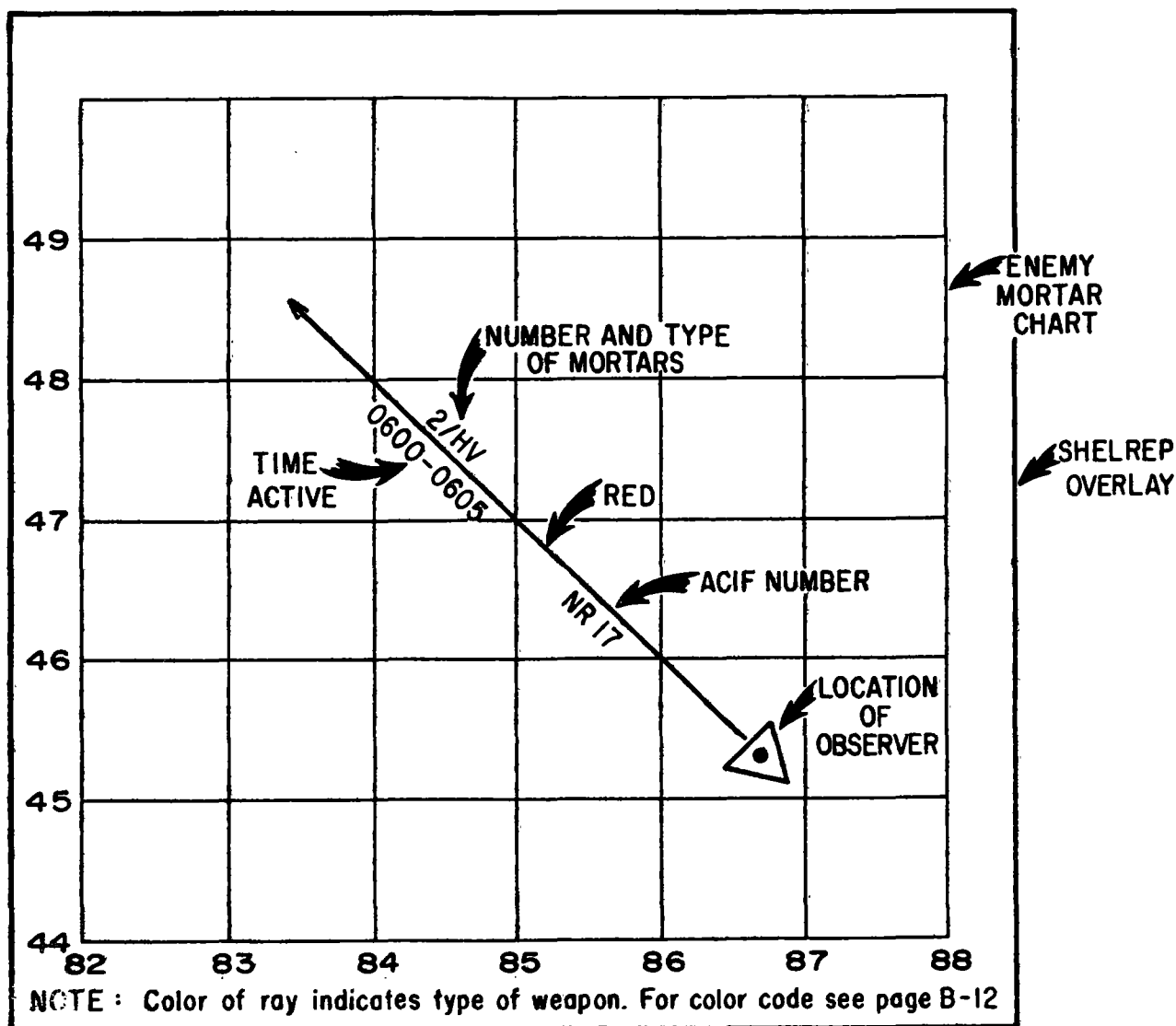


Figure C-3. SHELREP plot.

C-12. Reporting Types of Shells

a. Shells or fragments not positively identified should be reported immediately to the S2.

b. To be of maximum value, fragments should be tagged with the following information:

- (1) Date and time the shell landed, if known.
- (2) Location of point where the shell was found; as accurately as possible.
- (3) Direction from which the shell came and method used in determining that direction (survey of crater, sound, or flash).

(4) Name and organization of person making the report.

(5) Reference to shelling report on which this shell was reported, if known.

C-13. Specific Values of Reports

a. *Shelling Reports (SHELREP)*. Shelling reports furnish valuable information concerning the disposition and activities of the hostile weapons. By a detailed analysis of shelling reports, the artillery intelligence officer obtains information that may permit the location of hostile weapons and effective employment of counterbattery fires.

b. *Bombing Report (BOMREP)*. Bombing

reports provide valuable information to the intelligence sections of higher headquarters, both air and ground. They are used in the preparation of enemy air order-of-battle studies. If properly processed and analyzed, they indicate enemy air capabilities and intent as well as new developments, tactics, and doctrine.

C-14. Detail and Accuracy

The most reliable, accurate, and informative reports of hostile shelling or bombing are based on visual or electronic observation supplemented by crater and fragment identification. Reports (SHELREP, BOMREP) should

be as detailed and accurate as the necessity for speed will permit. *No individual should neglect or delay a report due to lack of complete information.* Fragmentary or incomplete information is often of value in supplementing or confirming existing information. All personnel, regardless of the arm of service, must be made aware of the necessity for reporting promptly shelling or bombing information that comes to their attention. However, the greatest volume of usable reports is submitted by specially trained personnel. Provision should be made for the training of such specialists within units of company-size and larger.

APPENDIX D

CRATER ANALYSIS AND SHEPREPS

Section I. LOCATION OF HOSTILE GUNS AND HOWITZER BY CRATER ANALYSIS

D-1. Gun and Howitzer Shell Crater Analysis

a. The projectile's direction of flight can be determined with reasonable accuracy from its crater or ricochet furrow. By accurately locating the crater and measuring the direction of flight, it is possible to obtain the azimuth of a ray that will pass through or near the enemy position. An enemy battery may be located by plotting the intersection of the average back-azimuths from two or more widely separated groups of craters from shells known to have been fired by that battery. It is also possible to determine the direction to a battery with fair accuracy from the back-azimuth obtained from one crater or ricochet furrow.

b. In crater analysis, differences in slopes of fall, projectile burst patterns, directions of flight, and time fuze settings will help to distinguish between enemy batteries firing on a given area.

c. Refer to FM 21-40 for guidance on friendly troop safety from the effects of craters contaminated with chemical agents.

D-2. Value of Analysis

By analyzing shell craters, it is possible to—

a. Verify, as confirmed locations, suspected locations that have been obtained by other means.

b. Confirm the presence of enemy artillery, and obtain an approximate direction to it.

c. Detect the presence of new types of enemy weapons, new calibers, or new ammunition manufacturing methods.

D-3. Inspection of Shelled Areas

Inspections of shelled areas are made as

soon as possible after the shelling. Craters which are exposed to the elements and are abused by personnel deteriorate rapidly, thereby losing their value as a source of information.

D-4. Survey of Crater Location

a. Areas must be accurately located for plotting on charts, maps, or aerial photographs. Deliberate survey is not essential; inspection, or inspection and short traverse using the aiming circle, or a compass for direction and pacing for distance, will suffice.

b. Refer to STANAG 2002, Contamination Markers, as implemented in FM 21-40, for guidance in marking craters containing chemical, biological, or radiological contamination.

D-5. Determination of Direction

a. *Pattern.* A clear pattern produced on the ground by the detonating shell indicates the direction from which the shell came.

b. *Factors Affecting Pattern.*

(1) It must be remembered that due to terrain irregularities and soil conditions, typical shell crater patterns are the exception, not the rule. Side spray marks compose a principal part of the pattern caused by fragmentation. There is much less effect from nose spray. Base spray is negligible from gun and howitzer projectiles, but is appreciable from mortars. The width, angle, and density of the side spray pattern vary with the projectile, the angle of impact, the type of fuze, and the terminal velocity of the projectile.

(2) In determining direction, the effect

of stones, vegetation, stumps, roots in the path of the projectile; variations in density and type of soil; and the slope of the terrain at the point of impact are considered. From any group, only the most clearly defined and typical craters are used.

c. Marks on Vegetation and Other Subjects.

The direction from which a round was fired is often indicated by the marks made as it passes through trees, snow, and walls. The possible deflection of the shell upon impact with these objects must be considered, and evidence of such deflection should not be overlooked.

d. Drift and Wind Effects. Drift and lateral wind effects do not materially change the direction of the shell's axis during flight. The ricochet furrow will be an extension of the plane of fire.

e. Ricochet Furrows.

- (1) When an artillery round with a fuze delay is fired at low angle, it will often bounce or ricochet from the surface of the earth. In doing so, it creates a groove which is called a

ricochet furrow. Ricochet furrows usually furnish the most accurate information regarding the projectile's direction of flight. The average direction of a few good furrows *from the same battery* will give a line that passes close to the battery position. Care must be taken, however, to determine that the shell was not deflected before or while making the furrow. *Shells often change direction at the point where a ricochet changes from a descending to an ascending path.*

- (2) Loose dirt should be carefully removed from the furrow by hand, leaving the smooth, hard channel intact. A stake or survey pin should be driven into the ground *at each end of the usable straight part of the furrow*. The stakes must be driven straight and just touching the center-line of the channel on the same side. The line between these stakes represents the line of fire. The azimuth of this line can be measured with an aiming circle or compass (fig. D-1).

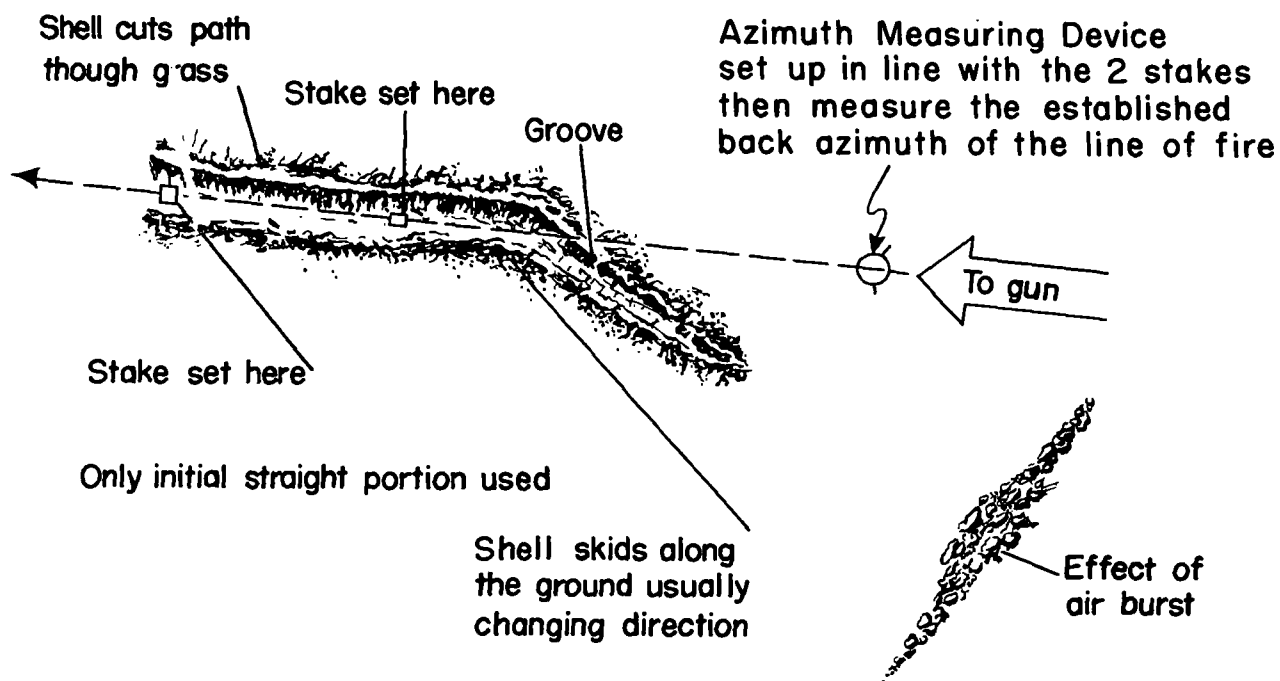


Figure D-1. Typical ricochet markings (vertical view).

f. Fuze-Quick Craters.

- (1) At small angles of fall, fuze-quick craters furnish information which is nearly as accurate as that from ricochet. Determining the direction of the trajectory becomes more difficult with an increase in the angle of impact; as a result, the analysis of more than one crater is required. When the angle of impact is small or moderate, the crater may appear somewhat pear-shaped. When the angle of impact is larger, the crater is generally oval with the smallest diameter in the direction of flight.

- (2) The direction of flight can be determined by examining the—

- (a) Groove in the ground where the shell enters (fig. D-2). To determine the direction, place a stake in the center of the channel. Place a second stake in the fuze exit groove on the opposite side of the crater (if distinguishable) or in the center of the crater. Sight along these stakes to obtain the back-azimuth. Fuze tunnels or grooves usually indicate the direction of fire.
- (b) Side spray effects are created by dirt and cut grass. First place a

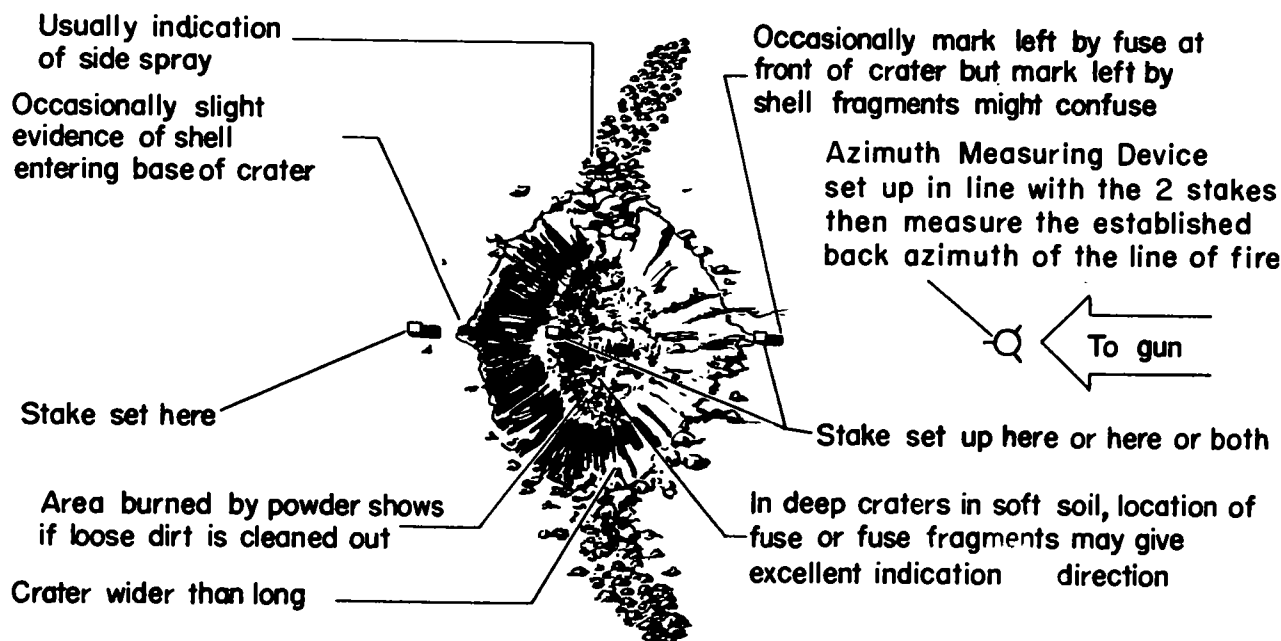


Figure D-2. Schematic shell crater, fuze-quick (vertical view).

stake in the center of the crater, then place stakes at the apex of the side spray equidistant from the center stake (fig D-3). From each of these side stakes, strike an equidistant arc to create a bisector of the smaller angle, then drive a stake at that point. The line from the center stake to this stake is the approximate line of fire. If an azimuth measuring device is available, it may be placed over the center of the crater, and the angle between

the two stakes measured and bisected.

- (c) The mean of the back-azimuths obtained from the operations described in (a) and (b) above is more dependable than the back-azimuth obtained from either method alone.

g. Deep Craters. The analysis of deep craters, which are caused by delay fuzes, is the least reliable in determining the direction of flight. In soft soil, good direction can be obtained if a nose fuze has been used.

Azimuth Measuring Device is set up here to measure side spray angle

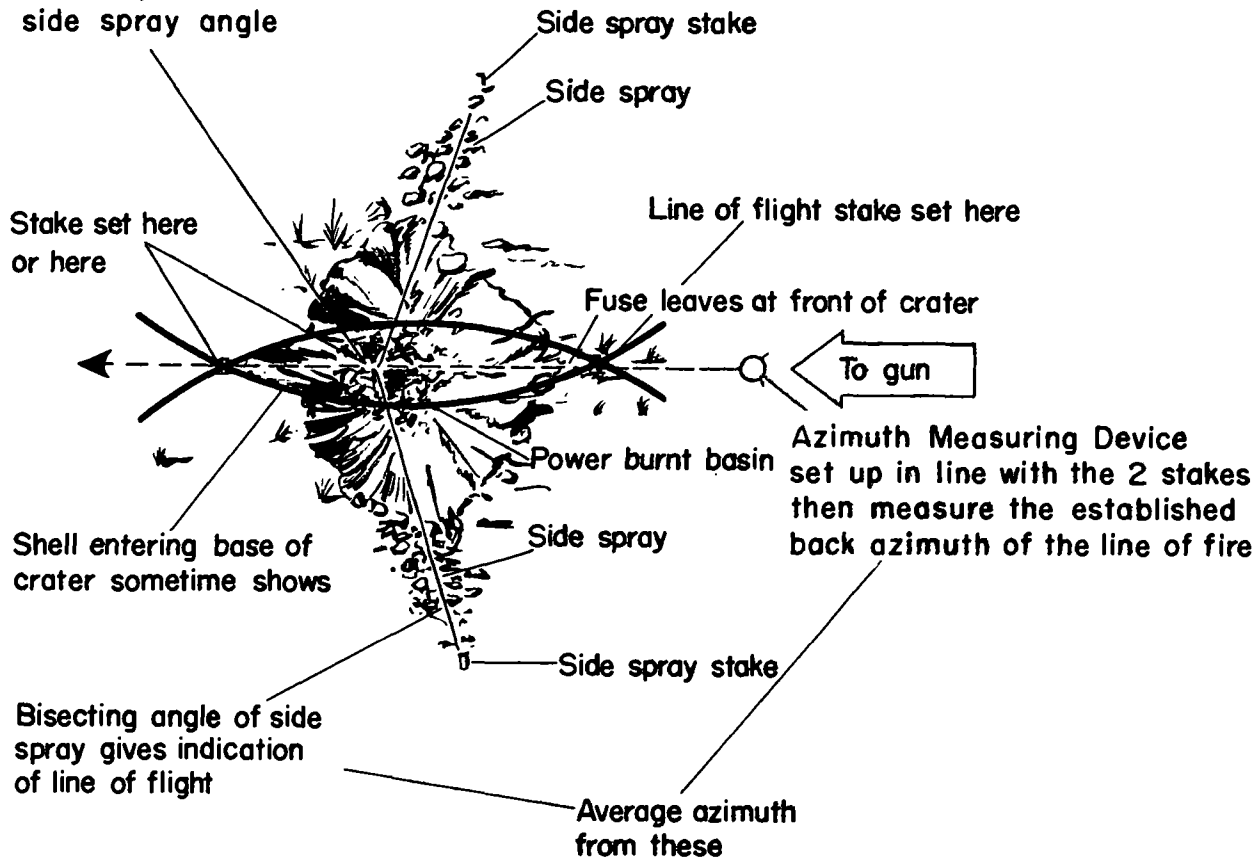


Figure D-3. Determination of direction by side spray (vertical view).

fuze will form a tunnel prolonging the shell's line of flight, and the line of fire can be determined from this tunnel and other characteris-

tics. Crater patterns are usually oval with the smaller diameter indicating the direction of fire.

Section II. LOCATION OF HOSTILE MORTARS BY CRATER ANALYSIS

D-6. Mortar Shell Crater Analysis

Mortar shell crater analysis is similar to the analysis of gun and howitzer craters. In fact, it is sometimes difficult to differentiate between craters of light howitzer and mortar projectiles.

D-7. Appearance of Craters

Mortar craters are characterized by the following:

a. At the front edge (one farthest from the mortar position) of the crater, the turf is un-

dercut (fig. D-4) while the back edge is shorn of growth and grooved or streaked by splinters.

b. When fresh, the crater is covered with loose earth which must be removed carefully to disclose the firm, burnt, inner crater (fig. D-4).

c. The fuze is buried in the bottom of the inner crater in front of the point of detonation (fig. D-4). In soft ground, the fuze will be buried deeply along the line of the trajectory.

d. The ground above the crater is streaked by splinter grooves radiating from the detona-

tion point (fig. D-4). The groove pattern depends on the angle of fall and the type of soil. Frequently, the ends of the splinter grooves on the rear side of the crater will be

on a straight line. This line is perpendicular to the line of flight on level ground or on slopes with contours perpendicular to the plane of fire (fig. D-4).

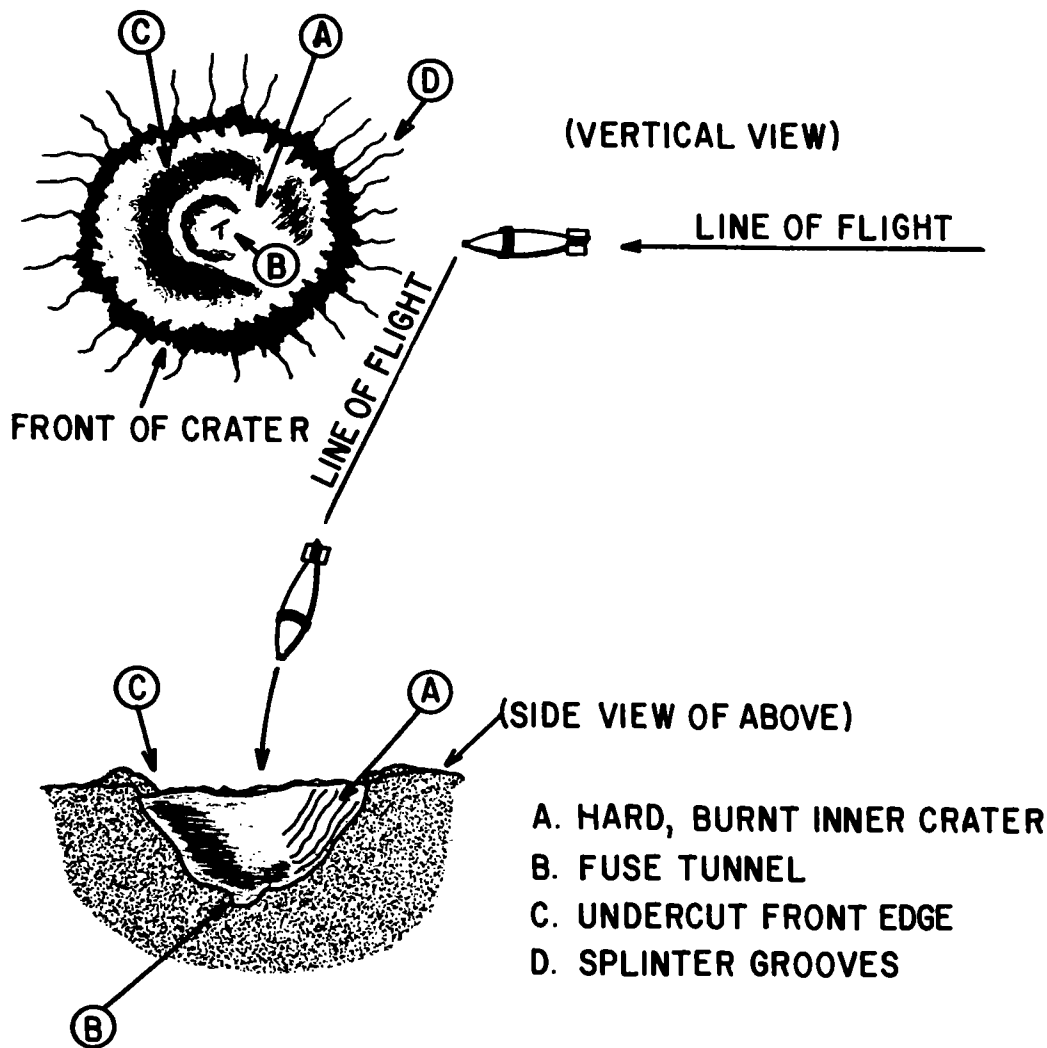


Figure D-4. Schematic mortar crater (vertical and side views).

D-8. Determining Direction to Mortars

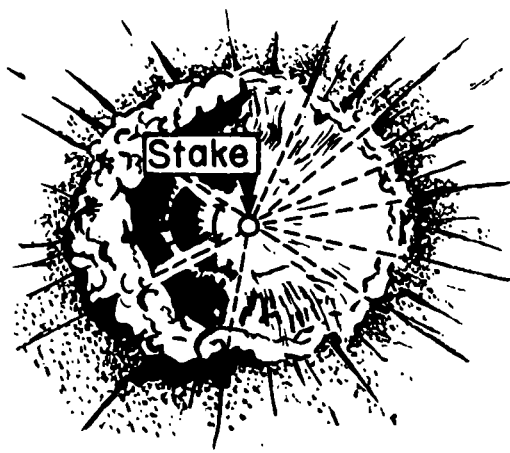
a. Three methods may be used to determine the line of flight from a mortar crater. They are as follows:

- (1) Carefully remove loose dirt from the crater. If a deep, well defined fuze tunnel has been created, a stick placed in this tunnel will point back along the trajectory ((1) fig. D-5).
- (2) Lay one stick along the ends of the splinter grooves on the side of the

crater toward the enemy mortar, and place another stick at right angles to the first ((2) fig. D-5). Measure the azimuth of the second stick.

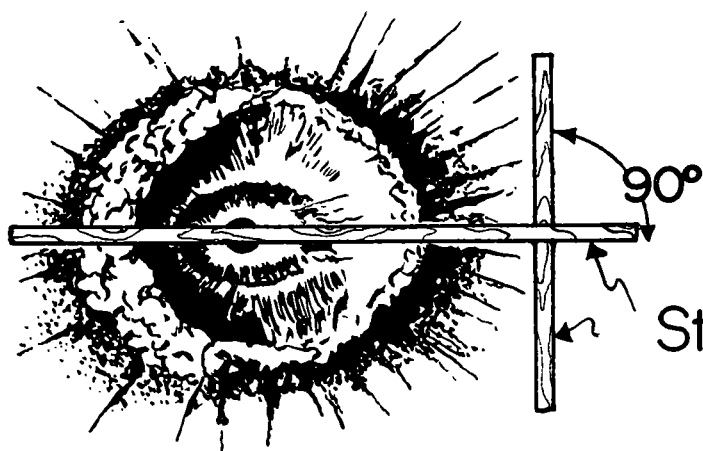
- (3) When a definite and regular crater is formed, a stick can be laid across the crater along its main axis, dividing the crater into halves. The stick points in the direction of the mortar ((3) fig. D-5).

b. The value of each method described in



Direction
to mortar →

① Locating point of detonation



Direction
to mortar →

Sticks

② Direction from splinter grooves



Direction
to mortar →

③ Direction from general shape

Figure D-5. Determination of the line of flight from a mortar crater (vertical view).

a(1), (2), and (3), above depends on soil type and ground form. Usually, direction is best de-

termined by a combination of the three methods.

Section III. BOMBING, SHELLING, AND MORTARING REPORTS

D-9. Content

a. In order to provide a standard method of rendering reports on enemy bombing, shelling, and mortaring within the NATO Forces operating on land, the United States Armed Forces, together with certain other NATO Armed Forces, have concurred in the provisions of STANAG No. 2008, Bombing, Shelling and Mortaring Reports. Details of STANAG No. 2008 are contained in appendix E.

b. Refer to STANAG 2103, Reporting of Enemy Chemical, Biological, or Nuclear Attack, as implemented in FM 21-40, for guid-

ance in reporting *type of attack* in conjunction with STANAG 2008.

D-10. Artillery Counterfire Information Form

When a SHELREP is combined with information locating enemy weapons and a record of counterbattery, artillery counterfire information form (DA Form 2185-R) (figs. D-6 and D-7) may be used. On this form, section I is the SHELREP (para 9), section II is pertinent to hostile battery location, and section III provides data for S3 action.

ARTILLERY COUNTERFIRE INFORMATION (FM 6-121)										
RECEIVED BY R.A.G.		FROM LNO 1			TIME 1300		NUMBER 7			
SECTION I - BOMREP, SHELREP OR MORTREP (Cross out items not applicable.)										
UNIT OF ORIGIN (Current call sign, address group or code name)	POSITION OF OBSERVER (Encode if Hq or important OP or F gives info on location)	DIRECTION Measured clockwise from GRID NORTH in degrees or mils (state which) of FLASH, SOUND or GROOVE of SHELL (state which) (Omit for aircraft)	TIME FROM	TIME TO	AREA BOMBED SHELLED OR MORTARED (Grid ref-- in CLEAR) or (Dir to impact in degrees or mils, dis in meters - - ENCODED)	NO. AND NATURE OF GUNS (Mortar, rocket launchers, aircraft, or other methods of delivery)	NATURE OF FIRE (Registration, bombardment, harassing, etc.)	NO., TYPE, AND CAL. (State whether measured or assumed) of SHELLS, ROCKETS, MISSILES, OR BOMBS	TIME OF FLASH TO BANG (Omit for aircraft)	DAMAGE (Encode if required)
a	b	c	d	e	f	g	h	i	j	k
CHARLIE 1	365487	1438 ✓	1250	1255	?	2?	?	18 ASSUMED	8 SEC	?
SECTION II - LOCATION OF HOSTILE WEAPONS						SECTION III - COUNTERFIRE ACTION				
UNIT OF ORIGIN AND TIME	GRID REF AND ACCURACY	MEANS OF LOCATING	TIME ACTIVE	NO. AND NATURE OF GUNS (Mortar, rocket launchers, aircraft, or other methods of delivery)	REMARKS	TIME C/FIRE	FIRE BY	NO. OF RD FUZE AND PROJECTILE	REMARKS (effect)	
l	m	n	o	p	q	r	s	t	u	

DA FORM 2185-R, 1 Nov 67

(Conforms with STANAG 2008.)

Edition of 1 Nov 58, is obsolete.

Figure D-8. Artillery counterfire information form showing SHELREP recorded.

ARTILLERY COUNTERFIRE INFORMATION (FM 6-121)										
RECEIVED BY C. M. G		FROM S2, 1ST BN, 16TH ARTY			TIME 1258		NUMBER 1			
SECTION I - BOMREP, SHELREP OR MORTREP (Cross out items not applicable.)										
UNIT OF ORIGIN (Current call sign, address group or code name)	POSITION OF OBSERVER (Encode if Hq or important OP or F gives info on location)	DIRECTION Measured clockwise from GRID NORTH in degrees or mils (state which) of FLASH, SOUND or GROOVE of SHELL (state which) (Omit for aircraft)	TIME FROM	TIME TO	AREA BOMBED SHELLED OR MORTARED (Grid ref-- in CLEAR) or (Dir to impact in degrees or mils, dis in meters - - ENCODED)	NO. AND NATURE OF GUNS (Mortar, rocket launchers, aircraft, or other methods of delivery)	NATURE OF FIRE (Registration, bombardment, harassing, etc.)	NO., TYPE, AND CAL. (State whether measured or assumed) of SHELLS, ROCKETS, MISSILES, OR BOMBS	TIME OF FLASH TO BANG (Omit for aircraft)	DAMAGE (Encode if required)
a	b	c	d	e	f	g	h	i	j	k
SECTION II - LOCATION OF HOSTILE WEAPONS						SECTION III - COUNTERFIRE ACTION				
UNIT OF ORIGIN AND TIME	GRID REF AND ACCURACY	MEANS OF LOCATING	TIME ACTIVE	NO. AND NATURE OF GUNS (Mortar, rocket launchers, aircraft, or other methods of delivery)	REMARKS	TIME C/FIRE	FIRE BY	NO. OF RD FUZE AND PROJECTILE	REMARKS (effect)	
l	m	n	o	p	q	r	s	t	u	
1/16 RADAR 1257	478675 100M	RADAR	1255	1 ?	AREA SHELLED 490650	1300	1/16	36 FZ 50% GK 50% UT	UNDER SURVEILLANCE OP #1	

DA FORM 2185-R, 1 Nov 67

(Conforms with STANAG 2008.)

Edition of 1 Nov 58, is obsolete.

Figure D-7. Artillery counterfire information form showing location of a hostile weapon and action taken.

APPENDIX E

STANDARDIZATION AGREEMENT

E-1. General

Standardization Agreements (STANAG's) are international (NATO) agreements designed to facilitate inter-Allied operations. Upon ratification by the United States, a STANAG is binding upon U.S. Army Forces (entirely or with exceptions as noted). This appendix contains STANAG's in their entirety.

E-2. STANAG No. 2008 (Edition No. 3)—Bombing, Shelling and Mortaring Reports

DETAILS OF AGREEMENT (DofA) BOMBING, SHELLING AND MORTARING REPORTS

Annex: (ADofA). Format for Bombing, Shelling and Mortaring Reports.
AGREEMENT

1. It is agreed that the NATO Armed Forces are to use the format shown at Annex (DofA) when rendering enemy bombing, shelling and mortar reports. (Additional reporting required when NBC weapons are involved is covered in STANAG 2103.)
2. It is further agreed that this format is to be completed as detailed in the following paragraphs of this Agreement.

CLASSIFICATION OF REPORTS

3. Completed reports are to be classified in accordance with current security regulations.

METHOD OF RENDERING AND TRANSMISSION

4. Reports are rendered as normal messages and are to be transmitted by the fastest means available.

CODE WORDS

5. Each transmission is to be preceded by one of the following code words:
 - a. SHELPREP (in the case of enemy artillery fire).
 - b. MORTREP (in the case of enemy mortar or rocket fire).
 - c. BOMREP (in the case of enemy air attack).

SECURITY OF MESSAGES

6. The message is always transmitted in clear except as follows:
 - a. Unit of Origin—Paragraph A of Annex A(DofA). The current call sign, address group or equivalent is to be used.
 - b. Position of Observer—Paragraph B of Annex A(DofA). This is

to be encoded if it discloses the location of a headquarters or an important observer post.

c. When the originator considers that the conditions prevailing warrant a higher classification. (e.g. paragraph K, if required.)

PARAGRAPHS

7. Each paragraph of the report has a letter and a heading. The heading may be included for easy reference to facilitate completion, but only the letters are to be transmitted if the report is sent by radio or telephone.

8. Paragraphs which cannot be completed or are not applicable are omitted from the report.

IMPLEMENTATION OF THE AGREEMENT

9. This STANAG will be considered to have been implemented when the necessary orders/instructions to adopt the method described in this Agreement have been issued to the forces concerned.

ANNEX A (DofA) TO STANAG
2008 (Edition No. 3)

FORMAT FOR BOMBING, SHELLING AND MORTARING REPORTS

(SECURITY CLASSIFICATION)

BOMREP, SHELREP OR MORTREP

(Indicate which)

- A. UNIT OR ORIGIN. (Use current call sign, address group or code name.)
 - B. POSITION OR OBSERVER. (Grid reference preferred—encode if this discloses the location of a headquarters or important observation post, or if sub-paragraph F.2., below is used to give information on location.)
 - C. DIRECTION measured clockwise from GRID NORTH in degrees or mils (state which) of FLASH, SOUND OR GROOVE OF SHELL (state which). (Omit for aircraft.)
 - D. TIME FROM.
 - E. TIME TO.
 - F. AREA BOMBED, SHELLED OR MORTARED. May be sent either as:
 - 1. Grid reference (Clear reference is to be used).
- OR
- 2. Direction measured clockwise from grid north to impact points (Degrees or mils—state which) and distance in yards or meters (state which) from observer. This information must be encoded. (When this method is used, maximum accuracy possible is essential.)
 - G. NUMBER AND NATURE OF GUNS, MORTARS, ROCKET LAUNCHERS, AIRCRAFT, OR OTHER METHODS OF DELIVERY.
 - H. NATURE OF FIRE. (Registration, bombardment, harassing, etc.) (May be omitted for aircraft.)

- I. NUMBER, TYPE AND CALIBRE. (State whether measured or assumed) of SHELLS, ROCKET (OR MISSILES) BOMBS, ETC.
- J. TIME OF FLASH TO BANG. (Omit for aircraft.)
- K. DAMAGE. (Encode if required.)

(SECURITY CLASSIFICATION)

3. STANAG 2029 (Edition No. 2)—Method of Describing Ground Locations, Areas and Boundaries.

DETAILS OF AGREEMENT (DofA)
METHOD OF DESCRIBING GROUND LOCATIONS,
AREAS AND BOUNDARIES

AGREEMENT

1. The NATO Armed Forces agree to adopt the method of describing ground locations, areas and boundaries described in the following paragraphs. They further agree that the method defined shall be used in all orders, instructions and reports and in any other circumstances where such descriptions are required.

DESCRIPTION OF LOCATIONS, AREAS AND BOUNDARIES

2. Use of Maps. In order to avoid confusion in the designation of place names when there are various editions of a map relating to the same area, the following will be shown at the top of the document:

- a. Map Series Number (and country or geographic area, if required).
- b. Sheet Number (and name, if required).
- c. Edition.
- d. Scale (if required).

Example: This information can be shown as follows:

Map series number	M 501 EUROPE
Sheet	NM 32-1 (ESSEN)
Edition	1—DMG
Scale	1:250,000

3. Security. The location of headquarters, units, dumps and other installations will only be mentioned in a communication or document if this communication or document can be transmitted to the addressee by a method ensuring the appropriate security. Locations of headquarters, units, dumps and other installations will not be included in addresses unless necessary to ensure correct delivery.

4. Names of Places.

a. Names of places will be written in block capitals exactly as spelled on the maps in use. The addition of a grid reference will almost always be necessary. In this case six figure grid references must not be used when four figures are sufficient. In certain areas, for which mapping material does not allow the use of coordinates, latitude or longitude designations will be used instead.

b. When a grid reference code is used, the names of places which it indicates must not be shown in clear in the same message.

5. Locations and Points on the Ground.

- a. Locations and points on the ground may be described either:
 - (1) by grid coordinates, or;
 - (2) by giving the distance and direction from a simple reference point e.g., "Cross-roads 1000 yards (or 1000 meters, South-west of church tower or NAPIERVILLE (square 6235)."

b. In written orders and reports, grid coordinates will always be used the first time the designation of a point or location is given. Thereafter, coordinates will be given only when such repetition ensures greater clarity.

6. Directions. A direction can be indicated either by two points or by angular measurement reading clockwise from a reference direction. In the latter case, directions will be given as from true, magnetic or grid north and the type used will always be specified. The unit of angular measurement used, i.e. mils or degrees is normally specified, but may be omitted when there is no probability of misunderstanding.

7. Roads, Tracks and Railways.

a. Roads, tracks and railways will be described by the names of places located on them. Care must be taken to name enough places to make sure that the right road can be identified. The word "road," "track," or "railway" will precede, not follow, the place names, e.g., "road LAPRAIRIE-DELSON," NOT "LAPRAIRIE-DELSON road."

b. When movement is involved, the route will be designated by a sequence of points on the route named in the direction of movement. When no movement is involved, the sequence of points named will be from left to right or rear to front, assuming that the person designating the route is facing the enemy. Cardinal points may be added if required.

8. Boundaries. Boundaries will be designated by easily distinguishable terrain features in the sequence in which they occur on the ground. They will be described from rear to front during an advance and from front to rear in defense and withdrawal. If generally parallel to the front, e.g. rear boundaries, they will be described from left to right, facing the enemy. Cardinal points may be added if required.

9. When describing boundaries between units and formations, the words "inclusive" or "exclusive" will be used. These words should be used before the place to which they refer. The description of a boundary will state specifically to which unit or formation an area or a point is inclusive or exclusive.

Example: 5 Brigade and 6 Brigade are advancing together. The inter-Brigade boundary will therefore, be described from rear to front. The most concise way of listing the various references comprising the boundary is to link them with one of the units/formations concerned, thus:

Boundary (ies)

5 Brigade	exclusive LAPRAIRIE	6134
	exclusive Cross Roads	621352
	inclusive Wood	624366.
	exclusive Road	
	LAPRAIRIE—DELSON	5238

10. River Banks. River banks are described as right or left from the point of view of an observer facing down stream or, if this cannot be done, by using cardinal points.

11. Areas. An area will normally be described by taking the northernmost point first and giving the remaining points in clockwise order.

12. Positions. Positions will be described from left to right and front to rear facing the enemy. To avoid confusion, cardinal points may be used to describe flanks, rather than "right" or "left."

IMPLEMENTATION OF THE AGREEMENT

13. This STANAG will be considered to have been implemented when the necessary orders/instructions to adopt the method described in this Agreement have been issued to the forces concerned.

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By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

Distribution:

To be distributed in accordance with DA Form 12-11 requirements for Field Artillery Target Acquisition.







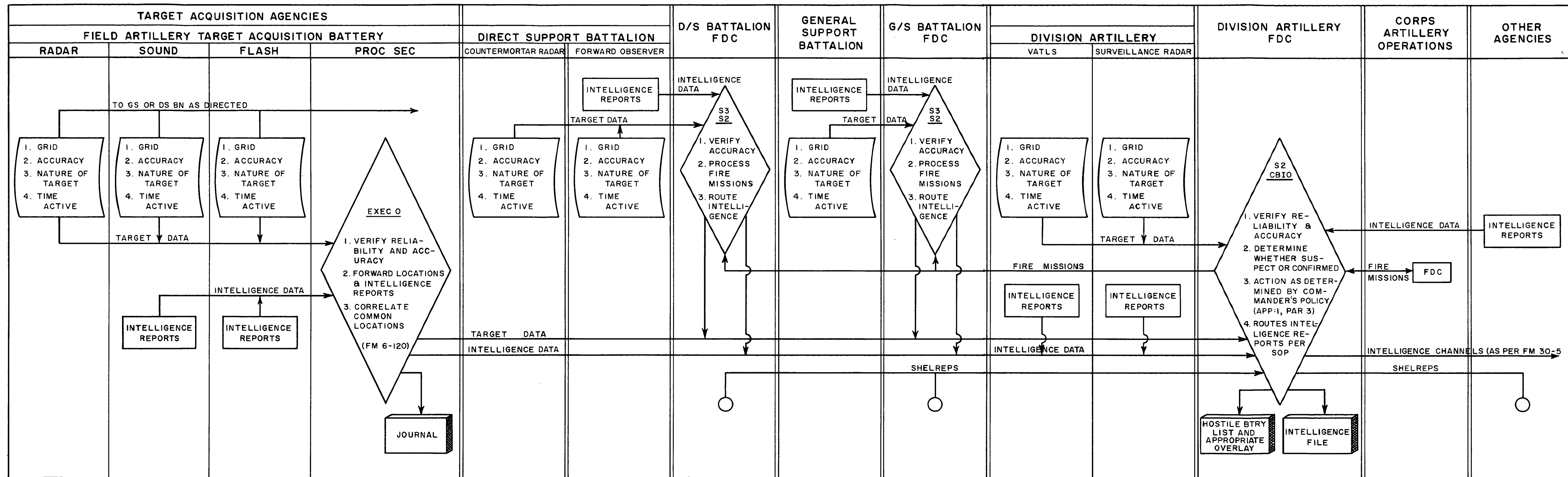


Figure 4-1. Artillery data flow (Target Acquisition)
Battery attached.

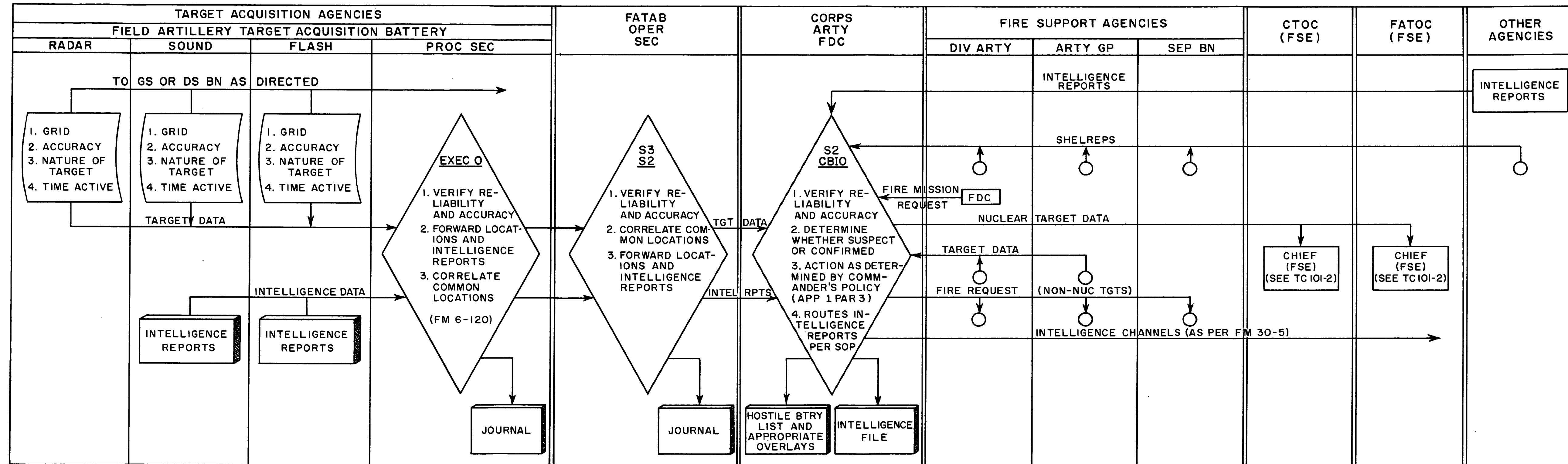


Figure 4-2. Corps artillery data flow chart (FATAB in support of Corps Arty).



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